

**Technical Report 1169**

**Future Soldiers: Analysis of Entry-Level Performance  
Requirements and their Predictors**

**Christopher E. Sager, Teresa L. Russell,  
Roy C. Campbell, and Laura A. Ford**  
Human Resources Research Organization

**September 2005**



**United States Army Research Institute  
for the Behavioral and Social Sciences**

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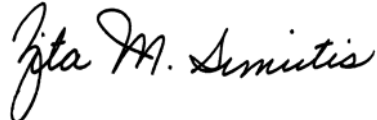
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**MICHELLE SAMS**  
Technical Director



**ZITA M. SIMUTIS**  
Director

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Technical review by

Robert N. Kilcullen, U.S. Army Research Institute  
Trueman R. Tremble, U.S. Army Research Institute

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# **Future Soldiers: Analysis of Entry-Level Performance Requirements and their Predictors**

**Christopher E. Sager, Teresa L. Russell,  
Roy C. Campbell, and Laura A. Ford**  
Human Resources Research Organization

**Selection and Assignment Research Unit  
Michael G. Rumsey, Chief**

U.S. Army Research Institute for the Behavioral and Social Sciences  
2511 Jefferson Davis Highway, Arlington, Virginia 22202-3926

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## FOREWORD

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The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) conducts research to support Army personnel and training goals. In recognition of the changes emerging with the Army's transformation, ARI developed a research program to identify, describe, and address future personnel requirements. This report describes an aspect of an ongoing ARI project concerned with future enlisted Soldiers.

The objective of this project, known as Select21, is to provide personnel tests for use in selecting and assigning entry-level Soldiers to future jobs. This report describes the initial phase of the project that consisted of a futuristic job analysis. The job analysis produced projections of a taxonomy of the jobs likely existing in the future, the performance demands of future jobs, and the knowledges, skills, and other personal attributes important to effective performance of the job requirements. These products were foundations for development of prototype personnel tests. These products were also the basis for design and development of an assessment of the likely usefulness of the prototype tests for selecting and assigning entry-level Soldiers to future Army positions.

Project Select21 is being conducted with support from the Army G-1, Deputy Chief of Staff for Personnel, and from the Army Training and Doctrine Command (TRADOC). ARI has briefed these sponsors, as well as representatives of other offices to include the Army Accessions Command, Human Resources Command, and the Army G-3, Deputy Chief of Staff for Operations. Research sponsors have provided the support and guidance needed for the success of the research.

MICHELLE SAMS  
Technical Director



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Many people contributed to the work documented in this report. Those not listed as authors include Dr. Trueman Tremble and Dr. Tonia Heffner from the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI). Dr. John Campbell, David Katkowski, Dr. Patricia Keenan, Dr. Deirdre Knapp, and Dr. William Strickland from the Human Resources Research Organization (HumRRO) also made significant contributions. We also received substantial support and guidance from our Army Subject Matter Expert Panel. We gratefully acknowledge all the ideas, feedback, and hard work related to this effort.



# FUTURE SOLDIERS: ANALYSIS OF ENTRY-LEVEL PERFORMANCE REQUIREMENTS AND THEIR PREDICTORS

## EXECUTIVE SUMMARY

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### Research Requirement

The Select21 project was undertaken to help the U.S. Army ensure that it acquires Soldiers with the knowledges, skills, and attributes (KSAs) needed for performing the types of tasks envisioned in a transformed Army. This transformation has involved planning and development of Future Combat Systems (FCSs) to achieve full spectrum dominance through a force that is responsive, deployable, agile, versatile, lethal, and fully survivable and sustainable under all anticipated combat conditions (U.S. Army, 2001, 2002). However, Army leadership recognizes the foremost the importance of people – its Soldiers – to the effectiveness of transformation. In this context, the ultimate objectives of the project are to (a) develop and validate measures of critical KSAs needed for successful execution of Future Force missions and (b) propose use of these measures as a foundation for an entry-level selection and classification system adapted to the demands of the 21<sup>st</sup> century. The purpose of this first stage of the project was to conduct a future-oriented job analysis to support the development and validation effort. This report describes this analysis.

### Procedure

Supporting the development of an understanding of the domain of future Army work required the development of a taxonomy of job clusters that included all likely future entry-level Army jobs. We used information about Army jobs from three areas (i.e., descriptions of the Future Force, current jobs, and existing job structures), a structured workshop, and consultations with subject matter experts (SMEs) to develop this taxonomy.

Supporting the development of predictor measures that could improve recruit selection required the development of Army-wide future performance requirements and KSAs (i.e., relevant to all entry-level Army jobs). This effort began with an extensive literature review. Using this literature, we developed draft lists of future Army-wide dimensions of performance, Army-wide (or common) tasks, and KSAs. We submitted these lists to a series of progressively finer-tuned reviews by SMEs. As we gained knowledge from experts and the literature, we developed a description of anticipated future Army-wide conditions. All of these materials were reviewed and modified by additional SMEs and scientists knowledgeable in the areas addressed by this research. Finally, importance of the KSAs to future Army-wide performance was evaluated via judgment exercises conducted with SMEs and psychologists.

Supporting the development of predictor measures that could be used to improve the assignment of recruits to future Army jobs (i.e., classification) required development of future performance requirements and KSAs specific to particular future Army jobs or groups of jobs (i.e., job clusters). This effort initially focused on the job clusters of future entry-level Army jobs. Next, two target clusters and three representative Military Occupational Specialty (MOS) for each cluster were selected. Workshops were conducted with Noncommissioned Officers (NCOs) representing each selected MOS to gather information that was reviewed and modified

by additional SMEs. This procedure resulted in tasks, task categories, anticipated future conditions, and prioritization of KSAs for each MOS.

## Findings

Future-oriented Army-wide performance requirements were described by (a) relatively broad performance dimensions, (b) more specific common tasks, and (c) anticipated future conditions addressing areas such as a greater emphasis on disciplined initiative and changes in the methods and frequency of communication. From the 16 future-oriented job clusters that were identified, two clusters (i.e., Close Combat [CC] and Surveillance, Intelligence, and Communications [SINC]) were selected for further investigation. The three MOS selected to represent CC were 11B (Infantryman), 19D (Cavalry Scout), and 19K (M1 Armor Crewman). The MOS selected for SINC were 31U (Signal Support Systems Specialist), 74B (Information Systems Operator/Analyst), and 96B (Intelligence Analyst). Future-oriented cluster/MOS-specific performance requirements were described by (a) MOS-specific lists of tasks organized by task categories and (b) cluster/MOS-specific anticipated future conditions. CC future conditions address areas such as the likely introduction of new FCS vehicles and individual weapons. An example SINC future condition is that technological advances will likely simplify installation, troubleshooting, and maintenance of equipment and replace some human tasks with automation. These performance requirements were used to assist in identifying relevant KSAs and provided the context in which to evaluate the importance of these KSAs to future performance.

A list of future-oriented pre-enlistment KSAs was developed that applied equally well to the Army-wide and cluster/MOS performance requirements. The list includes 12 cognitive attributes, 12 temperament attributes, 9 physical attributes, 7 psychomotor attributes, 2 sensory attributes, and 6 procedural knowledges and skills that represent major domains of individual differences relevant to job performance. Direct ratings of importance and linkages of KSAs to Army-wide performance dimensions and cluster/MOS-specific task categories provide information about the relative importance of KSAs to job performance.

## Utilization and Dissemination of Findings

This analysis generated future-oriented requirements that describe the nature of job performance for entry-level Soldiers during the transformation. These requirements guided the identification and prioritization of KSAs that are being used to develop new predictor measures useful for recruit selection and MOS assignment. The future-oriented requirements are also being used to develop job performance measures that will serve as criteria for evaluating these new predictors in an eventual concurrent criterion-related validation effort.



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## Chapter 1. Introduction

The U.S. Army is undertaking fundamental changes to move from the Current to Future Force. This transformation will involve substantial and ongoing changes to missions, systems, and organizational structures (U.S. Army, 2001, 2002). However, Army leadership recognizes first and foremost the importance of its people – Soldiers – to the effectiveness of the Future Force. In this regard, the Army is diligently seeking to ensure its transformation through Soldier and unit training, leader development, and the preparedness of Soldier systems.

### *Project Background*

The U.S. Army Research Institute for the Behavioral and Social Science's (ARI's) research on 21<sup>st</sup> Century Noncommissioned Officers (the NCO21 project) is one reflection of the Army's concern with Soldiers and their readiness for a transformed Army (Ford, Knapp, J. P. Campbell, R. C. Campbell, & Walker, 2000; Knapp et al., 2002). The purpose of NCO21 was to provide a foundation for NCO promotion decisions built on the capabilities that will be needed for successful performance in the early part of the 21<sup>st</sup> century. That research sought to provide this foundation by forecasting the personal attributes and experiences of NCOs that will most likely be important for performance of operational requirements and jobs in the future. The research team validated its projections by devising measures of the identified attributes and experiences and linking those predictor measures to measures of current job performance and potential future job performance. Importantly, the NCO21 project demonstrated the usefulness of a future-oriented research strategy and provided data on current and future NCO requirements.

The current project, titled New Predictors for Selecting and Assigning Future Force Soldiers (Select21), applies NCO21 methodology, lessons learned, and results to research on future Soldier requirements. The primary goal of Select21 is to ensure that the Army acquires Soldiers with the knowledges, skills, and attributes (KSAs) needed for performing the types of tasks envisioned in a transformed Army. The ultimate objectives of the project are to (a) develop and validate measures of critical KSAs needed for successful execution of Future Force missions and (b) propose the use of these measures as a foundation for an entry-level selection and classification system adapted to the demands of the 21<sup>st</sup> century.

### *Overview of Select21*

The major stages of this project are (a) future-oriented job analysis, (b) development of KSA/predictor measures, (c) development of criterion measures, and (d) criterion-related validation, as illustrated in Figure 1. The future-oriented job analysis provides the foundation for development of new measures (i.e., predictors) that could be used for recruit selection or assignment of recruits to particular jobs and development of job performance measures that will serve as criteria for evaluating the predictors. After field testing the predictor and criterion instruments, the potential usefulness of the predictors will be evaluated by comparing Soldiers' scores on the predictor measures to their scores on criterion performance measures (i.e., criterion-related validation). Select21's predictor measures will be evaluated in terms of improvements they offer to the current selection and classification system that relies largely on the Armed Services Vocational Aptitude Battery (ASVAB). These validation results will inform recommendations regarding potential additions or changes to the current selection/classification system.

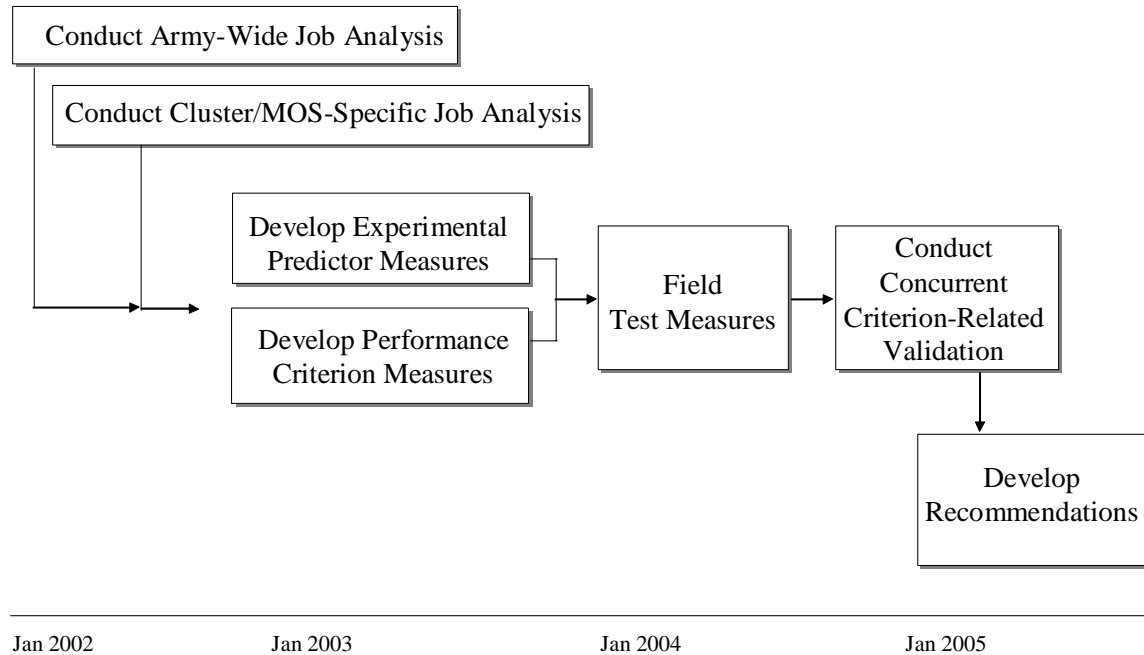


Figure 1. Overview of the Select21 research plan.

### The Research Problem

The Select21 project has three driving characteristics that present challenges for the research. They are as follows:

1. *Future-orientation.* Select21 is attempting to develop measures to predict performance in future jobs (i.e., jobs that do not yet exist). In addition to learning about the future Army during NCO21, we learned several lessons that affect our methods. For example, one of the most important findings was that detailed information about the future often changes dramatically in reaction to inevitable changes in systems and organizational structures that are still being developed. This means that future-oriented information is best appreciated in terms of relatively broad conditions that influence the overall picture of future performance requirements. In turn, it means that it is unrealistic to expect to gather accurate, stable job information at a specific level.
2. *Emphasis on selection and classification.* The objectives include proposing predictor measures to improve entry-level Soldier selection and classification. The goal of selection is to use measures of KSAs to identify individuals who will perform well in the Army generally, independent of the particular job to which they are assigned. The goal of classification is to use measures of KSAs to assign Soldiers to the jobs in which they will be most successful. This means that the project methods must reveal both general, or Army-wide, requirements and requirements that differentiate particular jobs or groups of jobs.

3. *Methodological integration.* Each stage of the Select21 project needs to yield data and information that will serve the needs of later project stages. These needs can be diverse. For example, the development of some predictor and criterion instruments might require very specific job information while an entirely different type of job information is needed to develop other instruments.

### *Future-Oriented Job Analysis Approach*

Future-oriented job analysis, the subject of this report, was the first major stage of the Select21 project. This section discusses the project's theoretical approach to job analysis and techniques designed to address many of the challenges presented by the three driving characteristics described above.

#### *A Theoretical View*

The primary goal of selection/classification is to positively affect the job performance of individuals/Soldiers. Consistent with this goal, this project began by seeking to develop a description of job performance (referred to here as future-oriented performance requirements). Here, job performance is defined as "...actions or behaviors that are relevant to the organization's goals and that can be scaled (measured) in terms of each individual's proficiency (that is, level of contribution)" (Campbell, McCloy, Oppler, & Sager, 1993, p. 40). Based on these descriptions of job performance, we make inferences about the KSAs Soldiers need to perform the behaviors that make up their performance requirements. Consistent with this view, our job analysis approach was driven by these future-oriented performance requirements. We defined the performance requirements and then identified a master list of future KSAs—including salient individual differences attributes identified in prior research. In turn, we linked the two—identifying the KSAs likely to predict each performance requirement.

#### *The Future*

Perhaps the most significant element of Select21's research problem is that its objectives include predicting performance in jobs that do not yet exist. The NCO21 project showed that useful descriptions of the future depend on an explicit definition of a future time period (Ford et al., 2000). The Select21 project focuses on the period of transformation to the Future Force—a transition that is envisioned to take on the order of 30 years to complete (Institute for Land Warfare, 2000). The Institute for Land Warfare indicated that the transformation will involve the Current, Stryker, and Future Forces.<sup>6</sup> The Current Force consists primarily of systems currently in use. The Stryker Force is taking shape in the form of Stryker Brigade Combat Teams (SBCTs). One goal of the SBCT is to fill the gap between light infantry that deploys quickly, but without very much firepower, and heavy forces that have plenty of firepower but take a very

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<sup>6</sup> Earlier documents related to the transformation from the Current Force to the Future Force refer to three entities. First, the Current Force stands for the Army as it is now; in some documents it is also referred to as the Legacy Force. Second, the Stryker Force referred to units employing transitional technology and methods designed to fill the gap between current capabilities and envisioned future combat systems (FCS). In some documents it is also referred to as the Interim Force. Finally, the Future Force stands for the Army that will be at the end of the transformation. In many documents it is referred to as the Objective Force. These terms are used in this section only to provide background. In most of the remainder of this report we will refer only to the Current and Future Force.

long time to deploy. Another goal is to serve as a development and testing bed for the Future Force. As indicated above, the Future Force is the Army that will be. The idea is that when the transformation is complete the Future Force, driven by the influence of future combat systems (FCS) and an expanding variety of missions, will be significantly different from the Current Force. However, the fact that the Future Force is likely to be different from the current Army has two important qualifications. The first is that the period of transformation from the Current Force through SBCTs to the Future Force was projected to last from FY2000 to FY2032. Most of this period of transformation is projected to include all three forces (Institute for Land Warfare, 2000).<sup>7</sup> The second qualification is that plans for the Future Force include modified versions of a significant number of currently operational weapon systems.

This conceptualization of the transformation implies that the next several years will include elements of all three forces. Our goal is to develop measures of KSAs that will be useful in the not too distant future and remain so for many years. Therefore, we decided to focus on the time period during which the current combat forces and the Stryker and future combat forces combined are roughly the same size.

Additionally, it is likely that advances in some technologies during the transition period will affect all three forces (i.e., Future, Stryker, and Current). For example, improvements in communications technology—although perhaps derived from research designed to support the Future Force—would most likely see applications in the Current and Stryker Forces as well. Thus, as we focus on requirements for all three forces during the transformation period, we are not limited to considering only today's requirements for the Current Force. There will be technology insertions into that force that may impact requirements Army-wide.

Finally, our understanding of the transformation continues to evolve as the Army's plans evolve and solidify. In turn, we have and will continue to adjust our technical approach and incorporate the most recent thinking into our plans and findings.

### *Selection and Classification*

Another element of Select21's research problem is the goal to improve selection and classification. Supporting the development of predictors that improve selection means identifying performance requirements that are common to all entry-level Soldiers and then identifying the KSAs important to performance on those requirements. We refer to these as Army-wide performance requirements. Developing predictors that improve classification efficiency depends on collecting job analysis information specific to particular Military Occupational Specialties (MOS).<sup>8</sup> The idea is to show how performance requirements differ across MOS, to guide the identification of KSAs that differ in relevance across MOS. Such a discovery would in turn facilitate the development of predictor measures that could improve classification efficiency.

*MOS Clusters.* Ideally, selection and classification research would focus on all Army MOS. However, the Army has about 175 entry-level MOS, and the current MOS structure is

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<sup>7</sup> Recent events suggest that this time frame could be extended.

<sup>8</sup> Military Occupational Specialty (MOS) is the Army's term for its enlisted jobs.

always changing (with some MOS merging and new MOS being created). A somewhat more general unit of analysis (i.e., job clusters) has several advantages. Job clusters are likely to be more stable into the future than the individual MOS themselves. Clustering also provides a comprehensive taxonomy of MOS; it makes studying requirements for the Army, in general, more manageable. The cluster taxonomy provides a structure for selecting an Army-wide Soldier sample in Select 21's eventual criterion-related validity investigation. Finally, the taxonomy provides descriptive information about the similarities and differences between MOS—information that permits the identification of differentiated clusters. Differentiated clusters are more likely to demonstrate classification efficiency than similar ones. The plan was to identify a number of future job clusters and select two clusters to focus on for the MOS/cluster-specific portion of our job analysis and measure development efforts. Based on these objectives the Select21 job analysis effort sought to identify and define Army-wide and cluster/MOS-specific performance requirements. These two parallel efforts are depicted in Figure 1.

*Time frames for performance requirements.* In addition to being clear about the future time-period of focus, developing performance requirements depends on an explicit definition of the individuals whose performance the effort is seeking to improve. In this case, they are “entry-level” Soldiers in the U.S. Army. More specifically, Select21 choose to focus on fully proficient first-term Soldiers; that is, individuals who have completed training and gained enough experience to have mastered the requirements of their entry-level job. This was viewed as roughly equivalent to what Army training materials refer to as skill level 1 (SL1; e.g., Department of the Army, 2003, 2002a). After a new Soldier enlists and completes basic training, job-specific training periods vary considerably and the amount of experience required to become fully proficient at SL1 also varies across jobs. Because the Army-wide job analysis spans across all entry-level Army jobs and analysis of a cluster spans across a number of these jobs, a standard Select21 definition of first-term Soldier was established as an individual who has been in the Army between 18 and 36 months.

### *Methodological Integration*

Another driving characteristic of the future-oriented job analysis is that it must provide information about (a) KSAs that support the development of predictor measures and (b) performance requirements that support the development of criterion measures against which the predictors can be evaluated in a criterion-related validity effort. This is relatively straightforward for the predictors because research on individual differences (i.e., KSAs) and measures of individual differences (i.e., potential predictor measures) served as a useful guide for the language we used to describe KSAs (e.g., Fleishman, Costanza, & Marshall-Mies, 1999). This requirement is somewhat less straightforward for measuring job performance because different types of criterion measures need different types of job analysis information to support their development.

*Performance measures.* Similar to the NCO21 project, Select21 is planning on job performance ratings scales for Army-wide current (but future oriented) performance and expected future performance. Relatively broad descriptions for performance requirements are satisfactory to support the development of these criterion measures. Here, NCO21 performance requirements served as a useful starting point. However, in the NCO21 project the correlation between scores on the current performance rating scales and future performance rating scales were very high (Knapp, McCloy, & Heffner, 2004). This result is consistent with the theory that

individuals tend to behave consistently over time. Additionally, some current performance requirements will remain relevant during and after the transition to the Future Force. However, Select21 criterion measurement efforts will seek to develop current and expect future performance ratings that show some discriminant validity.<sup>9</sup> Within the context of this goal and these constraints, our job analysis effort sought to include the capture of performance requirements unique to the Future Force.

Unlike NCO21, one of Select21's objectives was to improve classification into MOS. For this reason, we planned to develop cluster/MOS-specific criterion measures such as performance rating scales and job knowledge tests. Development of cluster/MOS-specific measures required very specific job analysis information defining the unique aspects of MOS or groups of MOS. Likewise, development of job knowledge tests required very specific job analysis information to help determine the content of multiple-choice items. Therefore, Select21 developed descriptions of performance requirements at multiple levels of specificity to provide a thorough analysis of Army-wide and cluster/MOS-specific work and support the development of the different criterion measures.

*Predictor measures.* Select21's research problem also put some important requirements on the KSAs that the job analysis sought to identify. Since the goal of this project is to develop measures that can be used for selection and classification, it was determined that the identification of KSAs should focus on characteristics that Soldiers are likely to have before enlistment (i.e., before they are trained on "common tasks" or on tasks specific to their MOS). Additionally, as mentioned above, the current system's primary predictor is the ASVAB. The ASVAB tests focus on verbal abilities, quantitative abilities, and a few specific knowledges (i.e., auto/shop, mechanics, and electronics). Therefore, identifying relevant KSAs that go beyond those currently assessed by the ASVAB and developing predictors that avoid unnecessary redundancy with ASVAB content will improve the likelihood of developing predictors that increment the ASVAB's power to predict future performance.

### *Future-Oriented Job Analysis Methods and Products*

#### *Methods/Approach*

The aim of this future-oriented job analysis was to combine relatively broad, dynamic plans for future directions with details about current first-term MOS and organizational structures (especially those that are not likely to change over time) to develop a description of future jobs at a level that is specific enough to guide predictor and criterion development. This section describes the general methodological approaches used in this effort.

*A top-down and bottom up strategy.* Describing a job that does not yet exist is a challenge. To meet the needs of predictor and criterion measurement, we needed information about the transformation – information that usually comes from high-level sources and policy-related documents – as well as the more traditional specific information about the performance of job tasks.

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<sup>9</sup> Several factors, beyond similarity in content and behavioral consistency over time, can influence the magnitude of the correlations between scores on current and expected future performance rating scales. Some have to do with the measurement tools and methodologies (e.g., the types of rating scales used and training given to raters). During the job analysis, it is important to accurately capture content and definitional differences between current and future requirements.



A top-down approach alone, gathering information from individuals and documents discussing FCS and future Army organizational structures, does not provide information at the level of detail required for task-based job analysis. Moreover, based on our NCO21 experience, we did not expect to be able to obtain accurate, stable information about future requirements at a very specific level.

On the other hand, bottom-up information about current Army-wide and MOS-specific performance requirements and occupational structures is relatively specific. While it is oriented towards the Current Force, it provides guidance in how to document future job/task requirements with greater specificity, particularly for requirements that will not change over time. Bottom-up information is also comprehensive; it addresses the full range of performance requirements in today's Army. Therefore, reviewing the bottom-up literature helped ensure that we did not overlook those current performance requirements that will remain important in the future. This top-down/bottom-up strategy was useful in the NCO21 project and was adapted for use in this project especially in the areas of developing performance requirements and future job clusters.

*Expert support.* During the NCO21 project, we learned that a future-oriented job analysis requires intense involvement of a few people with specific expertise. Traditional job analysis methods often involve large samples of job incumbents and supervisors. However, large numbers of individuals knowledgeable about the future job are simply not available. Often individuals that are highly knowledgeable about the Army's future plans are not knowledgeable about the specifics of jobs and vice versa. In Select21, subject matter experts (SMEs), who were carefully selected to provide a particular type of expertise, participated in a series of workshops and reviews of materials. Similar to the NCO21 project, many of these reviews were in the context of Select21's three standing panels of scientific and Army SMEs—a Scientific Review Panel, an Army Steering Committee, and an Army Subject Matter Expert Panel.

The Scientific Review Panel (SRP) is composed of five highly regarded scientists knowledgeable in the areas addressed by this research. The SRP panel contributed to the job analysis by (a) approving job analysis data collection plans, (b) providing feedback on the completeness and quality of performance requirements and KSAs, and (c) contributing to the selection of future job clusters to be targeted.

The Army Steering Committee (ASC) is a policy advisory group that includes senior representatives from a number of Army organizations concerned with the transformation from the Current to the Future Force. One role of the ASC was to provide top-down information and direction to ensure that Select21 plans and products remained consistent with the vision and needs of the Army. This group also helped with access to Army SMEs for various job analysis data collections.

The Army Subject Matter Expert Panel (SMEP) is composed of personnel who are expert in particular Army MOS or in the specific plans for the Future Force. Based on their respective expertise, members of this panel provided essential bottom-up information about particular MOS and top-down information about ongoing efforts focusing on the Army's transformation. For example, one member was from the Objective Force Task Force, and another was from the Unit of Action Maneuver Battle Lab (UAMBL). The SMEP worked closely with the project team on specific research products and troop support for workshops and other data collections.

Finally, Soldiers and NCOs participated in a number of workshops and other data collections over the course of the job analysis. In addition to documents describing current Army jobs, they were our primary source of bottom-up information.

### *Products*

The future-oriented job analysis yielded several products intended to facilitate development of predictor and criterion measures. Those products and their intended uses are described in Table 1.

*Army-wide performance requirements.* Together, three of the job analysis products make up the Army-wide performance requirements: (a) dimensions of performance, (b) common tasks, and (3) anticipated future conditions. The common tasks fit within the first performance dimension (Performs Common Tasks), as shown in Figure 2. The performance dimensions provide a description of the critical dimensions of performance in the Future Force, are helpful for developing criterion instruments, and assist in identifying relevant KSAs. The Select21 common tasks provide enough technical details to facilitate development of future-oriented multiple-choice questions of current performance. Our NCO21 experience (Knapp et al., 2002) suggests that the anticipated future conditions will support development of the expected future performance criterion (e.g., ratings of expected future performance).

*Job clusters and cluster/MOS-specific performance requirements.* As mentioned earlier, a taxonomy of clusters that capture the full domain of likely future entry-level Army jobs has several advantages for the Select21 project. We plan to use it to develop plans for selecting an Army-wide Soldier sample for Select21s' eventual criterion-related validity research. That is, to the extent possible, the Army-wide sample will be specified such that it includes Soldiers from MOS associated with each Select21 job cluster.

Importantly, the job cluster taxonomy provided information about the clusters that allowed us to select two target clusters and three target MOS within each cluster. These target clusters and MOS became the focus of the cluster/MOS-specific portion of the job analysis and measure development efforts. At first, we tried to develop task lists that (a) provided a complete description of cluster-specific performance requirements, (b) applied to all three target MOS in each target cluster, (c) were sufficiently detailed to support the development of measures of current job performance (e.g., multiple-choice knowledge tests, and ratings), and (d) were future-oriented enough to support the development of measures of expected future performance. As expected, this approach was not straightforward—clusters present a unit of analysis problem. Project staff found that individual cluster-level tasks either (a) did not apply to all the relevant MOS, (b) were so broad that they applied to MOS outside the cluster, or (c) did not provide information in sufficient detail to guide criterion development. Additionally, cluster level tasks were simply too confusing for SMEs who are entrenched in a specific MOS. Accordingly, we retained the clusters for sampling jobs for inclusion in this effort and for summarizing results across MOS, but we created an MOS-specific task list for each of the target MOS to support development of MOS-specific measures.<sup>10</sup>

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<sup>10</sup> We also considered the idea of supplementing the task lists with lists of job specific tools and equipment. However, we soon found that job specific tools and equipment are highly unit/assignment-dependent, making it difficult to create lists that were applicable to most everyone in a target MOS.

*Table 1. Future-Oriented Job Analysis Products and Their Uses*

Future-Oriented Job Analysis Product	Description	Intended Uses Beyond the Job Analysis
Job Cluster Taxonomy	16 job clusters that capture the full domain of likely future entry-level Army jobs, two target job clusters for future analysis, and three target MOS to represent each cluster	Identification of Army-wide and MOS-specific samples of Soldiers for the criterion-related validation investigation
Army-Wide Dimensions of Performance	19 general components of first-term Soldier performance expected to be critical to the future and conceptually consistent with job performance dimensions developed for previous Army projects	Development of Army-Wide Current Observed Performance Rating Scales and a Criterion Situational Judgment Test
Army-Wide Common Tasks	59 individual technical tasks conceptually consistent with the Army's current list of common tasks that all first-term Soldiers should be able to perform	Development of an Army-Wide Job Knowledge Test
Army-Wide Anticipated Future Conditions	Narrative descriptions of six future conditions likely to be relevant to all first-term Soldiers	Development of Army-Wide Expected Future Performance Rating Scales
MOS-Specific Task Lists	A list of task categories and specific tasks for first-term Soldiers in each of six target MOS	Development of MOS-Specific Current Observed Performance Rating Scales
Cluster/MOS-Specific Anticipated Future Conditions	Narrative descriptions of first-term Soldier anticipated future conditions specific to clusters/MOS	Development of Cluster/MOS-Specific Expected Future Performance Rating Scales
Army-Wide Knowledges, Skills, and Attributes (KSAs).	48 pre-enlistment KSAs covering measurable, relevant individual differences constructs across a number of domains (i.e., cognitive, temperament/personality, physical, psychomotor, and sensory)	Development of predictor measures for the field test

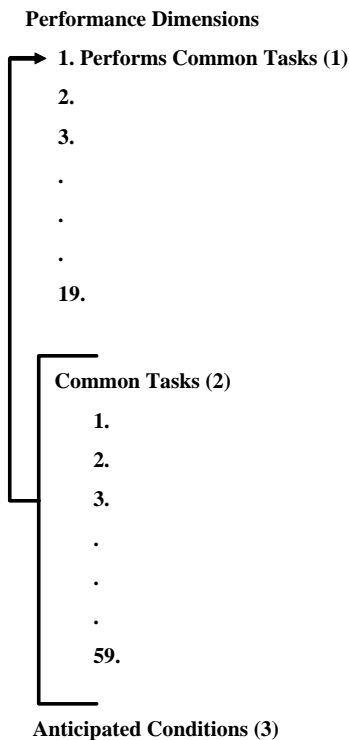


Figure 2. Three products representing the Select21 Army-wide performance requirements.

The MOS-specific task lists provided support for (a) developing measures of current performance and (b) identifying relevant cluster/MOS-specific KSAs. Each task list was organized into task categories. The tasks focused more on current performance than future performance because, as indicated previously, it is difficult to develop future tasks that are sufficiently stable or specific enough for measurement. This was a difficulty anticipated in the project's work plan. To fill this gap, we developed cluster/MOS-specific anticipated future conditions. These anticipated conditions supported development of the primary cluster/MOS-specific expected future performance criterion (i.e., ratings of expected future performance). Together the task categories, tasks, and future conditions represented the cluster/MOS-specific performance requirements.

*Knowledges, skills, and attributes (KSAs).* Select21's original research plan envisioned Army-wide and cluster-specific KSAs. We started out by developing a list of Army-wide KSAs. After reviewing this completed list, we determined that it included all of the pre-enlistment KSAs likely to be relevant for the target clusters and MOS. Therefore, this single list was used in the Army-wide and cluster/MOS-specific job analysis workshops and rating and linking exercises.

### *Overview of Report*

This report describes the procedures and results of the future-oriented job analysis. Chapter 2 discusses the development of the Select21 future job clusters, selection of two target clusters for the cluster/MOS-specific job analysis, and identification of three MOS to represent each target cluster. Chapter 3 provides details regarding the development of Army-wide

performance requirements and KSAs. Chapter 4 describes the development of cluster/MOS-specific performance requirements. Chapter 5 summarizes the prioritization of KSAs relative to Army-wide and cluster/MOS-specific performance. Chapter 6 is a discussion and analysis of Select21's future-oriented job analysis methods and products. This report includes a number of appendices; each is referred to in its relevant chapter. Appendix A provides a list and description of all the job analysis meetings, briefings, and data collection workshops. Appendix B is a bibliography containing documents relevant to the Army's transformation and the Select21 job analysis effort that were collected during this phase of the project.



## Chapter 2. Identification of Job Clusters and Target Job Clusters

### *Overview*

As mentioned in Chapter 1, future-oriented job clusters provide a manageable taxonomic structure for the Army's current and anticipated future jobs. Our plan was to identify two different job clusters likely to demonstrate the potential for classification efficiency and focus on those target job clusters in our research effort. We also expected the taxonomy to be useful for organizing elements of the rest of this project and considering the impact of technology and organizational innovations on first-term Soldiers in the Future Force.

### *Identification of Job Clusters*

To best serve the needs of the project, the job clusters needed to be (a) *comprehensive* in describing the full domain of likely future entry-level Army jobs;<sup>11</sup> (b) *future-oriented*, clearly identifying the changing nature of jobs, as currently forecasted; (c) *differentiated* from each other, to maximize the potential for classification efficiency; and (d) *descriptive* to support the selection of target clusters and MOS.

Development and description of these job clusters involved three steps: (a) assembling information about the future Army and existing MOS to form a solid basis for decision-making, (b) identifying initial clusters drawing on the expertise of HumRRO and ARI research staff, and (c) finalizing the clusters by gathering input from Army personnel knowledgeable about the transformation and Army jobs.

### *Relevant Information*

We gathered and reviewed information about Army jobs and the future from two directions: top-down and bottom-up. The top-down approach involved collecting and reviewing strategic-level publications on the Future Force and future technologies. For example, these documents included:

- A collection of Army briefing slides (e.g., Institute for Land Warfare, 2000)
- *United States Army White Paper: Concepts for the Objective Force* (U.S. Army, 2001)
- *The United States Army Objective Force: Tactical Operational and Organizational Concept for Maneuver Units of Action* (Draft TRADOC Pamphlet 525-3-91, 2001)
- Potential Factors Influencing the Future Army: 2000 to 2025 (from Appendix A: *21<sup>st</sup> Century Soldiers and Noncommissioned Officers: Critical Predictors of Performance* in Ford et al., 2000)
- Future Army Areas (from Appendix C: *21<sup>st</sup> Century Soldiers and Noncommissioned Officers: Critical Predictors of Performance* Ford et al., 2000)

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<sup>11</sup> Here we refer to future entry-level Army jobs, instead of MOS, to acknowledge that the transformation to the Future Force may result in an occupational structure very different from the one represented by the current MOS.

Specifically, the top-down review provided information on four key topics:

- Missions to be conducted by the Future Force;
- Anticipated personnel requirements for these future missions;
- New technology such as weapons, tools, and vehicles (e.g., robotics) and the effect of technological change on personnel requirements; and
- Anticipated changes in force structure and the organization of jobs.

The bottom-up approach involved analyzing current MOS descriptions (e.g., *U.S. Army Pamphlet 611-21*; Department of the Army, 1999) and current organizations of these MOS. These organizations included the Career Management Fields (CMF), Army Aptitude Area (AA) job families currently used for classification, and alternative job families proposed by recent research (Zeidner, Johnson, Vladimirovsky, & Weldon, 2000).

### *Identification of Initial Clusters*

Since we needed to identify future-oriented job clusters, our approach was, by necessity, a judgmental process. The type of information used as input and the experience of the experts involved were critical to the efficacy of the derived clusters. In this process, we wanted to make decisions that took information about current jobs, existing job structures, and the futures literature into account. We also wanted to draw on the expertise of HumRRO and ARI staff with significant military knowledge and experience. Toward those ends, we designed a three-stage workshop process that would incorporate different kinds of expertise and information:

1. *Primary group sort.* Six research staff met to consider the top-down and bottom-up information in depth and to develop an initial sort of entry-level MOS and hypothesized future jobs into clusters. One member was assigned as an “advocate” for each of the three areas (i.e., current jobs, existing job structures, and the futures literature). The advocates were responsible for ensuring that their assigned area of information appropriately influenced the clustering process.
2. *Review group input.* The primary group presented the results of their initial clustering to a review group composed of three HumRRO and three ARI staff with significant applied Army personnel research experience. The role of the review group was to provide feedback on the efficacy of the assumptions and clusters developed by the primary group.
3. *Revisions.* Based on discussion and feedback from the review group, the primary group agreed on revisions to the clustering scheme and finished sorting remaining MOS into the clusters.

These steps occurred during a 2-½ day workshop and continued during follow-up phone calls and emails that lasted a week.

*Primary group sort.* At the onset of the workshop, the group discussed the futures literature and identified three explicit assumptions that would guide clustering decisions. The



first assumption was associated with the period of time on which the Select21 project will focus. As described in Chapter 1, we decided to focus on the time period during which the Current combat forces and the Stryker and Future combat forces combined are roughly the same size.

The second assumption was that changes in missions and advances in technology will affect all three forces (i.e., the Current Force, SBCTs, and the Future Force). For example, many improvements in communications technology will likely be applicable to Current Army and SBCT systems as well as FCS. Another example is that some advances in emergency medicine could result in equipment and techniques that would be applied to all three forces.

The third assumption was that advances in technology will affect the structure and content of jobs. For example, simplifying maintenance support is a major goal of the Future Force. Common platforms, increased reliability, more effective diagnostic equipment, and modular components are likely to result in the consolidation of mechanical maintenance jobs and the movement of additional maintenance activities from these jobs to operator jobs.

Before clustering jobs, the primary group agreed that clusters should meet the following four criteria:

- The clusters need to fully represent anticipated changes in the Army during the time period of interest.
- The clusters need to describe the full domain of future Army jobs.
- Jobs within each cluster need to be more similar to each other in terms of duties and other requirements than jobs across clusters; that is, clusters should be differentiated in terms of performance/task requirements.
- The clusters need to be described in sufficient detail to support the selection of two or more for the more detailed analysis.

Before the workshop, we prepared descriptions of all the current entry-level MOS and some other MOS that could potentially become entry-level MOS in the future. The descriptions of these 175 MOS were derived from *U.S. Army Pamphlet 611-21* (Department of the Army, 1999). Most of these descriptions were a half-page to a full page in length and included information about major duties, SL1 and 2 requirements, and physical demands. We randomly selected a sample of 50 entry-level MOS for the initial sort and added a couple MOS to the pile to ensure that populous MOS, such as Infantryman, were represented.

During the workshop, the primary group independently sorted the sample of 50 MOS into clusters. Each member then presented his/her clusters to other primary group members. The group identified areas of consensus and resolved disagreements based on the above criteria. They then began organizing their materials so that their discussion and decisions could be presented to the review group.

*Review group input.* After reaching consensus on a tentative clustering scheme, the results were presented to the review group. The primary group presented and discussed the basic assumptions with the review group. Then, the primary group presented their initial clustering

scheme, discussing the main concept for each cluster and its constituent MOS. The review group made specific suggestions for handling some MOS, brought up specific issues for the primary group to consider, and agreed with the broad clusters defined by the primary group.

*Revisions.* After the presentation and discussion, the primary group made refinements to the clusters and assigned the remaining MOS to clusters.<sup>12</sup> The result of this effort was 17 clusters. The primary group wrote initial descriptions of the 17 clusters using the job descriptive materials and notes from the workshop discussions.

### *Final Clusters*

We conducted briefings and discussions to refine and finalize the cluster solution. Army SMEs at Fort Lee who are associated with the Combined Arms Support Command (CASCOM) reviewed the clusters from the perspective of maintenance and support units. Additionally, representatives of the Objective Force Task Force reviewed the clusters from a future-oriented perspective. In both discussions, we obtained very specific information about the nature of the clusters and expectations for the future. While the main clustering scheme remained intact, the participants made some recommendations for moving specific MOS to different clusters and for collapsing two clusters into other ones. In one case, they indicated that the distinction between two of our clusters was too fine and that the two clusters should be merged. In the other case, the reviewers believed one of our clusters to be more of a mission than a job cluster, per se. They suggested merging it with a closely related cluster. This resulted in 15 clusters. Later a cluster was added to represent Band MOS; this brought the total to 16 clusters.<sup>13</sup> They are listed in Table 2; clusters descriptions and associated current MOS appear in Appendix C. Clusters 1 and 2 include core combat jobs. Clusters 3 through 5 include jobs that relatively directly support combat activities. Clusters 6 through 16 include jobs whose primary function is sustainment.

### *Selection of Target Clusters and MOS for Further Study*

Having identified job clusters, the next step was to select two job clusters and three MOS within each of them that would be the targets for remaining research steps. We considered a number of factors relevant to selecting target clusters, including:

- *Criticality*—the expected criticality of jobs in the cluster to the effectiveness of the Future Force,
- *Differentiation*—the extent to which the clusters represent extremes or differences that should be captured in selection instruments and classification equations,
- *Anticipated Change*—the extent to which the person requirements for the jobs in the cluster are likely to be different in the Future Force than they are currently,

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<sup>12</sup> During the clustering exercise, a few of the original 175 MOS were removed from the list based the project staff's determination that they were very unlikely to be entry-level MOS (e.g., Special Forces MOS) in the foreseeable future.

<sup>13</sup> Band MOS were left out of the initial clustering exercise because of their unique and largely autonomous selection process; however, they were eventually added to ensure that the clusters together represented the full domain of likely future Army jobs.

- *Accuracy*—the extent to which future person requirements for the job cluster can be identified with certainty, and
- *Practicality*—the extent to which it will be possible to identify and gain access to Soldiers needed in the instrument development and validation phases of the project.

*Table 2. Final Select21 Job Clusters*

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1. Close Combat
2. Non Line-of-Sight Fire
3. Surveillance, Intelligence, and Communications
4. Unmanned Vehicle/Robotics Operator
5. Security and Civil Affairs
6. Mechanical Maintenance/Repair
7. Electronics Maintenance/Repair
8. Aircraft Maintenance/Repair
9. Administration
10. Logistics/Supply Support
11. Heavy Equipment Operator
12. Craftworker
13. Medical Care, Health, and Well-Being
14. Skilled Science Technician
15. Media Specialist
16. Band

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Prior to any external panel discussions, HumRRO and ARI staff determined that the Close Combat (CC) cluster is so central to the concept of the Future Force, that it should be one of the target clusters. CC is a critical cluster with a great deal of anticipated change. It was also a practical choice, given the large numbers of enlisted personnel in CC MOS. Pre-selection of CC had an added benefit. Since we wanted the two target clusters to be differentiated (i.e., to allow for examination of classification effects during the validation effort), we could ask experts to identify a second, differentiating cluster, given that CC had already been selected.

We conducted a series of expert reviews, each time asking experts to consider these factors and make judgments about the relative merits of the clusters. First, we reviewed the clusters with the SRP and explained the recommendation to preselect CC. The SRP supported this decision and rated the remaining clusters on four factors: (a) criticality, (b) differentiation, (c) anticipated change, and (d) accuracy. The SRP declined rating practicality, leaving that to other experts with more knowledge regarding potential access to Army Soldiers. We presented the results of the rating exercise. Panel members discussed the results and, afterward, individually rank ordered their top picks. After additional discussion, panel members agreed that any selections from their list of 5-6 top picks would be acceptable. Based on their rankings and discussion, their top six selections for the second target cluster were in order as follows:

1. Surveillance, Intelligence, and Communications (SINC),
2. Security and Civil Affairs,
3. Mechanical Maintenance and Repair,
4. Electronic Maintenance and Repair,
5. Medical, and
6. Logistics.

After the SRP meeting, project staff rated the clusters on all five factors listed above. We averaged the staff ratings and met to identify a recommended cluster. During this meeting we considered the SRP and staff judgments, the numbers of Soldiers in MOS associated with the favored clusters, and yet another review of the original criteria. While a number of clusters were good candidates for inclusion, we selected Electronic Maintenance and Repair as our top choice, with SINC and Logistics being our second and third choices respectively. We favored the SINC cluster, but were concerned that it might be difficult to gain accesses to SINC Soldiers given their dispersion in the field and the level of security associated with some of the cluster's MOS. We also began selecting MOS that would be good representatives of each cluster and would have sufficient entry-level enlistees to support the project's future data collection efforts.<sup>14</sup>

Next, we met with the SMEP and presented our choices of clusters and MOS. For the CC cluster, the SMEP agreed with our choice of three representative (i.e., target) MOS. However, the SMEP recommended SINC as the second cluster and did not believe that troop accessibility would be a problem. The SMEP recommended three MOS to represent SINC.<sup>15</sup> The SMEP's review finalized the clusters and the choices of target clusters/MOS. Consequently, the final target job clusters and MOS were as follows:

- Close Combat
  - 11B Infantryman
  - 19D Cavalry Scout
  - 19K M1 Armor Crewman
- Surveillance, Intelligence, and Communications
  - 31U Signal Support Systems Specialist<sup>16</sup>
  - 74B Information Systems Operator/Analyst
  - 96B Intelligence Analyst

As an additional verification of our decisions, we presented our final choices to the ASC. The Army G-1, the activity responsible for Human Resources Management at the Army Field Operating Agency (FOA) level, approved these target clusters and MOS based on agreement that they will be important to the Future Force.

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<sup>14</sup> We selected specific current MOS as the best current and future representatives of the future job clusters. We assume that these MOS will change in the future. However, we do believe that they are MOS whose functions will remain central to the Army throughout and long after the period of transformation to the Future Army.

<sup>15</sup> The SMEP moved the 31U from the Electronic Maintenance and Repair cluster to the SINC cluster and indicated that 74B was more central to the SINC cluster than project staff had hypothesized.

<sup>16</sup> After the job analysis, 31U was officially reclassified as 25U.



## Chapter 3. Army-Wide Job Analysis: Identification of Performance Requirements and Knowledges, Skills, and Attributes

### *Overview*

As described in Chapter 1, one goal of the job analysis was to identify the performance requirements and KSAs that will be required to perform that part of the job that is common to all entry-level Soldiers in the future. This effort began with a literature review in three areas—future Army literature; research literature on jobs, particularly Army MOS; and literature on human attributes (i.e., KSAs). The future Army literature provided information that allowed us to make initial inferences about (a) Future Force missions; (b) the functions and roles that Soldiers will play in those missions and the KSAs those Soldiers will need; (c) new technology such as weaponry, vehicles, communication devices, and the effect of technological change on personnel requirements; and (d) likely changes in the force structure in the future. Research on jobs provided information about general taxonomies of task, task lists developed in other Army projects, and KSAs. Literature on human attributes informed us about KSAs that have been identified and measured reliably in the major domains of human individual differences—including cognitive, personality, psychomotor, physical, skill, and interest domains.

Using these bodies of literature, we developed draft lists of future Army-wide performance requirements and future KSAs. We submitted these lists to a series of progressively finer-tuned reviews by experts. The KSAs were also rated by both a panel of psychologists and by the SMEP. This chapter describes the detailed steps and the products—Army-wide performance requirements and KSAs—of this work.

### *Identification of Army-Wide Performance Requirements*

Based on the Army's experiences in the NCO21 and Project A projects, we identified the need for three Army-wide job analysis products:

1. Performance dimensions—Descriptions of the critical dimensions of performance in the Future Force. A performance dimension (e.g., supporting peers, operating a weapons system, etc.) is a distinct category of actions, tasks, or “things people must do” on a job that are important for the organization's goals. Performing them poorly has significant negative consequences. Performing them well contributes significantly to goal achievement. Performance dimensions are helpful for developing criterion instruments and for identifying relevant KSAs.
2. Common tasks—A list of tasks common to all Future Force entry-level enlisted jobs. A task is a specification of an action that an individual should be able to carry out. Common tasks are those that are, according to Army doctrine, relevant to all Soldiers (e.g., Department of the Army, 2003). The Select21 common tasks must provide enough technical details to facilitate development of future-oriented multiple-choice questions of current performance.
3. Anticipated future conditions—Narrative descriptions that highlight salient features of the Future Force environment relevant to job performance. They are helpful for the development of future oriented criteria.

While there is some overlap between the dimensions and common tasks, each product captures aspects of the performance domain the other does not. The performance dimensions and tasks represent job analysis at two different levels of specificity, each aimed at supplying the information necessary to develop different job performance criterion measures. For example, the dimensions are very helpful for job performance rating scales, and the tasks are at the correct level of specificity for developing multiple-choice tests. The anticipated future conditions support development of the expected future performance criterion (e.g., ratings of expected future performance).

### *Literature Review*

The overall objective of the literature review was to generate an initial description of future Army-wide performance requirements that could be further refined by additional SME input. Appendix B is a bibliography that lists relevant sources examined. Four types of sources were most useful in constructing a draft of the Army-wide performance requirements. They were:

- Future era performance demands,
- Future era junior non-commissioned officer KSAs,
- Common Soldier tasks, and
- Recent Future Force projections.

*Future era performance demands.* The NCO21 project developed a taxonomy of future-era first-term performance demands (Ford et al., 2000). Its development started with a set of baseline dimensions based on taxonomies from major ARI selection and classification research projects including Project A/Building the Career Force (Campbell & Knapp, 2001), the Synthetic Validation Project (Wise, Peterson, Hoffman, Campbell, & Arabian, 1991), the Expanding the Concept of Quality in Personnel (ECQUIP) project (Anderson et al., 1995), and the Special Forces job analysis project (Russell, Crafts, Tagliareni, McCloy, & Barkley, 1996). These projects developed their taxonomies from varied sources. Some were based on critical incident studies, some were based on task categories developed from the task descriptors contained in Soldiers' Manuals or in Army Occupational Survey instruments, and some were based on additional SME data collections conducted as part of the projects. These taxonomies were synthesized by Ford et al. (2000) into a single set of baseline performance dimensions.

Ford and her colleagues then modified and refined these baseline performance dimensions using future-era literature and information from workshops with SMEs. They developed what we refer to here as a list of first-term Soldier performance demands, organized into the following six characteristics of the Future Force:

- Transition to digital operations and an increase in technologies,
- Diverse missions and frequent deployments,
- Diversity of forces,
- Decentralized operations,
- Training, and
- Youth population changes and recruitment





This list of demands is defined here by three notable characteristics: (a) they include important parts of the job performance domain (e.g., performance dimensions like practical problem solving), (b) they emphasize how future performance requirements are likely to change relative to current requirements, and (c) they provide detailed information about the context in which future work will be performed. These demands were an important source of “top-down” information describing broad influences on future performance requirements. It is also relevant to note that since it was not possible to predict future oriented performance requirements in terms of a complete list of specific tasks, the demands are good general descriptions of future performance requirements.

*Future era junior NCO KSAs.* Another useful source of information is the set of KSAs identified as potentially relevant to the prediction of future junior NCO performance during the NCO21 project (Ford et al., 2000). Table 3 displays the highest ranked of those KSAs.

*Table 3. NCO21’s Most Important KSAs for Promotion to Junior NCO*

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1. MOS/Occupation-Specific Knowledge and Skill
2. Conscientiousness/Dependability
3. General Cognitive Aptitude
4. Motivating and Leading Others
5. Characteristic Level of Effort and Initiative
6. Need to Achieve and General Energy Level
7. Oral Communication Skill
8. Characteristic Level of Integrity and Discipline
9. Judgment and Decision Making Skill
10. Common Task Knowledge and Skill
11. Fostering Adaptive Teamwork
12. Physical Fitness
13. Relating to and Supporting Others
14. Directing, Monitoring, and Supervising Work

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*Note.* From *21<sup>st</sup> Century Soldiers and Noncommissioned Officers: Critical Predictors of Performance* (Technical Report 1102; p. 52), by L. A. Ford, D. J. Knapp, J. P. Campbell, R. C. Campbell, and C. B. Walker, 2000, Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. Adapted with permission.

In NCO21, these KSAs had been conceptualized as characteristics of first-term Soldiers that would predict junior NCO performance. In Select21, we used some of these KSAs to make inferences about behaviors needed for effective performance in the Future Force. For example, “Characteristic Level of Effort and Initiative” became “Exhibits Effort and Initiative on the Job.” While one of the highly ranked KSAs was clearly outside the domain of Army-wide performance requirements (i.e., MOS/Occupation-Specific Knowledge and Skill), and some were not specifically characterized in behavioral terms (e.g., General Cognitive Ability, Need to Achieve), some of the KSAs could be directly transferred to Army-wide performance dimensions for first-term Soldiers. Together with the performance demands described above, these KSAs served as the foundation of the *Select21 Army-Wide Performance Dimensions for First-Term Soldiers*.

*Common Soldier tasks.* For current SL1 Army-wide requirements, the Army has a published set of “task” specifications—*STP 21-1-SMCT*, the *Soldier’s Manual of Common Tasks, Skill Level 1* (Department of the Army, 2001, 2003).<sup>17</sup> There are 86 tasks in the 2001 edition, including tasks in categories such as see, communicate, navigate, shoot, and survive. We supplemented this list with the results from an ARI project to survey common tasks (Gosc, Mitchell, Wessmuller, & Tartell, 1999). That project resulted in the identification of 122 SL1 common Soldier tasks and 111 skill level 2 (SL2) common Soldier tasks. Among other additions to the existing list, this project added a category that may best be labeled “Complies with Army Standards.” Common tasks are specifications for training objectives. Consequently, they are not necessarily isomorphic with job performance standards, and there is considerable variability across tasks in terms of their scope and complexity. However, they were an important source of bottom-up information.

*Recent Future Force projections.* Since the NCO21 job analysis work (Ford et al., 2000), there has been considerable work related to designing and describing the Future Force and the process of transformation (e.g., U.S. Army 2001, 2002). Some documents and presentations are relevant because they describe important broad characteristics of the Future Force (e.g., Hawley, 2002; Steele, 2001, 2002; U.S. Army Transformation Panel, 2000). Other documents seek to describe the nature and structure of the Future Force in some detail (e.g., Omega Training Group, 2001; UAMBL, 2002a; U.S. Army Training and Doctrine Command [TRADOC], 2002). Still others discuss the implications of transformation relative to the tasks that would be associated with envisioned systems and the implications of modernization for skill requirements (e.g., Nelson & Akman, 2002; UAMBL, 2002b). These documents differ considerably in their level of detail and the extent to which they focus on specific systems, some of which are in very early stages of development. They contributed significantly, as a source of top-down information, to our understanding of the future and specifically to the development of the *Anticipated Army-Wide Conditions in the 21<sup>st</sup> Century for First-Term Soldiers*, described later in this chapter.

Especially useful in the development of the *Select21 Army-Wide Common Tasks for First-Term Soldiers*, discussed latter in this report, were the tasks proposed by UAMBL (2002b). UAMBL is a TRADOC modeling and simulation activity located at Fort Knox; it was formed to conduct product research, integration, and virtual modeling for the FCS. The UAMBL is also the TRADOC consolidated point of concentration for FCS tactics, techniques, and procedures (TTP) development. In support of TTP demonstrations, the UAMBL Training Branch produced a consolidated common task list. We reviewed the UAMBL draft list for a further scrub to enhance the completeness of our draft list.

### *Development of Select21 Army-Wide Performance Dimensions*

Using the NCO21 junior NCO KSAs and future era first-term performance demands as building blocks, project staff developed a draft of the *Select21 Army-Wide Performance Dimensions for First-Term Soldiers*. This resulted in a good initial list because it took advantage of the Ford et al. (2000) literature review that included recent Army research efforts and NCO21’s recent future oriented job analysis results. Based on comments from the SRP, some titles and definitions were modified to more clearly distinguish them from skills. Based on

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<sup>17</sup> At the time this work was performed, the 2001 version of the common tasks was the latest available. Select21’s more recent activities have taken the 2003 version into account. It has not significantly changed these results.

comments from the SMEP, a Teamwork dimension was added and the definition of the original Relates to and Supports Peers dimension was modified so that the two dimensions would be distinct. After a number of SME interviews/workshops and review of more recent Future Force documents, additional modifications were made to (a) more accurately reflect the most recent visions of the future, (b) reduce redundancy, and (c) further differentiate the dimensions from each other. The resulting Army-wide performance dimensions are shown in Table 4.

The performance dimensions were later reviewed by the SMEP and SRP. As a final quality check, we asked SMEP members to carefully review and rate the importance of each performance dimension to the effective performance of first-term Soldiers in the future. Not surprisingly, the SMEP members indicated that all of the performance dimensions (which they had helped us develop) were important. No dimension received a mean rating less than 3.00 on a 5-point scale.

#### *Development of Select21 Army-Wide Common Tasks*

Development of the Army-wide common task list involved integrating a wealth of job information, making inferences about how job tasks are likely to change in the future, preparing draft lists, and revising draft versions in accordance with comments from the SMEP.

*The first draft.* An initial review of the future-oriented literature provided a basis for evaluating the extent to which we could use the current common tasks to develop a list of Select21 future-oriented common tasks. We reviewed all SL1 and 2 tasks from the expanded list (i.e., tasks from the *Soldiers Manual of Common Tasks* [Department of the Army, 2001] and Gosc et al. [1999]). We chose to include the SL2 tasks because the literature review and discussions with SMEs provided evidence that some SL2 tasks may migrate downward in the future. However, specific SL2 supervisory tasks are unlikely to become SL1 requirements. Therefore, we deleted those SL2 tasks that are supervisory in nature.

We then revised the combined list to convey a future orientation (e.g., rewording tasks that refer to specific pieces of equipment or weapons or reorienting tasks based on our knowledge of plans for the Future Force). For example, the tasks

- Engage targets with the M16A1 or M16A2 rifle,
  - Maintain the M16A1 or M16A2 rifle, and
  - Operate the M16A1 or M16A2 rifle;
- became
- Engage targets with a personal weapon,
  - Maintain personal weapon, and
  - Operate personal weapon.

*UAMBL.* Next, we used the UAMBL task list to revise the tasks. During this process (a) UAMBL tasks judged to be at too high a level were left out, (b) redundant current and UAMBL tasks were merged, (c) a number of tasks were merged to achieve a more uniform level of specificity across tasks, and (d) some tasks were added based on other Future Force sources (e.g., U.S. Army, 2001; TRADOC, 2002).

Table 4. Select 21 Army-Wide Performance Dimensions for First-Term Soldiers

1. *Performs Common Tasks.* Possesses the necessary knowledge and skill to perform common tasks at the appropriate skill level (e.g., land navigation, field survival techniques, and chemical, biological, radiological and nuclear [CBRN] protection).
2. *Solves Problems and Makes Decisions.* Reacts to new problem situations by applying previous experience and previous education/training appropriately and effectively. Does not apply rules or strategies blindly. Assesses costs and benefits of alternative solutions and makes timely decisions even with incomplete information.
3. *Exhibits Safety Consciousness.* Follows the details of safety guidelines and instructions. Checks the behavior of others to ensure compliance.
4. *Adapts to Changing Situations.* Is able to maintain commitment when environments, tasks, responsibilities, or personnel change. Does not allow stress in high-pressure situations to interfere with job performance. Easily commits to learning new things when the technology, mission, or situation requires it.
5. *Communicates in Writing.* Communicates thoughts, ideas, and information successfully to others through writing. Uses proper sentence structure including grammar, spelling, capitalization, and punctuation.
6. *Communicates Orally.* Speaks in a clear, organized, and logical manner. Communicates detailed information, instructions, or questions in an efficient and understandable way. Note that this dimension refers to how well the individual can speak and communicate, not whether technical expertise is high or low.
7. *Uses Computers.* Understands and uses computer interfaces and applications (e.g., email, World Wide Web, and Army-specific systems).
8. *Manages Information.* Effectively monitors, interprets, organizes, and redistributes information (i.e., digital, printed, or oral). Does not readily succumb to information overload.
9. *Exhibits Cultural Tolerance.* Demonstrates tolerance and understanding of individuals from other cultural and social backgrounds, both in the context of the diversity of U.S. Army personnel and interactions with foreign nationals during deployments or when training for deployment.
10. *Exhibits Effort and Initiative on the Job.* Demonstrates high effort in completing work. Takes independent action when necessary. Seeks out and willingly accepts responsibility and additional challenging assignments. Persists in carrying out difficult assignments and responsibilities.
11. *Follows Instructions and Rules.* Understands and carries out instructions relayed orally or in writing. Adheres to regulations, policies, and procedures while completing assignments.
12. *Exhibits Integrity and Discipline on the Job.* Maintains high ethical standards. Does not succumb to peer pressure to commit prohibited, harmful, or questionable acts. Demonstrates trustworthiness and exercises effective self-control. Understands and accepts the basic values of the Army and acts accordingly.
13. *Demonstrates Physical Fitness.* Meets Army standards for weight, physical fitness, and strength. Maintains health (e.g., dental hygiene) and fitness to meet requirements, to handle the physical demands of the daily job, and to endure the stress of combat.
14. *Demonstrates Military Presence.* Presents a positive and professional image of self and the Army even when off duty. Maintains proper military appearance. Sets the precedent for other Soldiers to follow.
15. *Relates to and Supports Peers.* Treats peers in a courteous, respectful, and tactful manner. Shows concern for others by providing help and assistance. Backs up and fills in for others when needed.

Table 4. (Continued)

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16. *Exhibits Selfless Service Orientation.* Commits to the greater good of the team or group. Puts organizational welfare ahead of individual goals as required.
  17. *Exhibits Self-Management.* Effectively manages own responsibilities (e.g., work assignments, personal finances, family, and personal well being), and appears on duty prepared for work. Sets goals, makes plans, and critically evaluates own performance. Works effectively without direct supervision, but seeks help when appropriate.
  18. *Exhibits Self-Directed Learning.* Takes responsibility for mastering skills and learning to apply those skills in the job. As necessary, effectively invests time in learning and practice. Mastery of skills includes those (a) acquired during basic and advanced individual training and (b) additional skills required by the Soldier's initial assignment.
  19. *Demonstrates Teamwork.* Understands own and team tasks in relation to the mission or assignment. Coordinates with and helps members maintain focus on the team's goals.
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*Final tasks and task categories.*<sup>18</sup> A primary purpose for developing the common tasks was to provide job analysis information at the level of specificity necessary to facilitate the development of multiple-choice and hands-on criterion measures of future-oriented current performance. Additionally, it was important to maintain continuity with the Army's concept of a task that is closely tied to Soldier manuals and reflects training objectives related to particular equipment and procedures. Therefore, we organized the 59 tasks into categories, similar to those used in past efforts (e.g., Gosc et al., 1999); the tasks being very specific and the task categories being slightly broader. This list, *Select21 Army-Wide Common Tasks for First-Term Soldiers*, appears in Appendix D.

#### *Development of Anticipated Future Conditions*

We developed a third Army-wide job analysis product, *Anticipated Army-Wide Conditions in the 21<sup>st</sup> Century for First-Term Soldiers*. Our goal was to present a set of conditions for first-term Soldiers similar to the nine future conditions identified as relevant for NCOs during the NCO21 project (Knapp et al., 2002). We considered that list in conjunction with (a) recent documents forecasting various characteristics of the Future Force (e.g., Hawley, 2002; Omega Training Group, 2001; Steele, 2001, 2002; U.S. Army 2001, 2002; TRADOC, 2002; U.S. Army Transformation Panel, 2000; UAMBL, 2002a) and (b) a number of the interviews with Army SMEs. Research staff identified anticipated changes described in those materials, extracted statements about changing conditions, and synthesized the ideas from different materials to form a draft anticipated future conditions for first-term Soldiers. After a number of revisions among project staff, the *Anticipated Army-Wide Conditions in the 21<sup>st</sup> Century for First-Term Soldiers* were reviewed, discussed, and modified by the SMEP members during one their meetings. The final version appears in Table 5.

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<sup>18</sup> We reviewed several other sources of information during task list development, particularly non-technical tasks from the Gosc et al. (1999) work, a model of team member performance (Olson & Campbell, 2001) and the Occupational Information Network's (O\*NET's) taxonomy of Generalized Work Activities (Jeanneret, Borman, Kubisiak, & Hanson, 1999). In the end, these sources were too generic to be of use in development of the common task list.

Table 5. Anticipated Army-Wide Conditions in the 21<sup>st</sup> Century for First-Term Soldiers

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### Learning Environment

*Throughout their careers, Soldiers play a greater role in their own professional development, by keeping pace with changing operational requirements, new technologies, common weapons platforms, and evolving doctrines. (The Objective Force in 2015, p. 9).*

- Greater requirement for continuous learning and the need to independently maintain/increase proficiency on assigned tasks
  - With considerable time constraints
  - Potentially more complex material
  - Some learning may become more structured. For example, topics that would currently be covered by on-the-job experience might increasingly be addressed by embedded training, distance learning, or other methods of computer-assisted instruction.

### Disciplined Initiative

*In a transformed Army culture, every Soldier is trained and equipped to be a decision maker (The Objective Force in 2015, p. 8).*

- Less reliance on supervisors and/or peers to perform assigned tasks
- This does not mean complex decision making outside of the Soldier's defined responsibilities. However, because of potential for increased time pressure and dispersion of individuals, it does mean that Soldiers will need to be able to perform tasks with less back-up from supervisors and/or peers.

### Communication Method and Frequency

*The digitization of the U.S. Army represents the greatest change in warfighting since the Napoleonic era and lays the foundation for the conduct of warfare in the 21<sup>st</sup> century (The Army Magazine Hooah Guide to Army Digitization, 2001).*

- Greater need to function based on digitized communication (i.e., text, voice, video) instead of face-to-face communication
- Greater understanding of the common operational picture and increased situational awareness

### Individual Pace and Intensity

*The future operational environment for the UA [Unit of Action] strongly suggests the tempo and intensity of operations will expose Soldiers to the enduring stresses on the battlefield (TRADOC PAM 525-3-90 O&O, July 2002, p. 137).*

- Greater need for (a) mental and physiological stamina and (b) awareness of current mental and physiological status
- Greater need for mental and physiological adaptability
  - Flexibility regarding personal cycles such as sleep, eating, and leisure
  - Ability to maintain focus and commitment when environments, tasks, responsibilities, or personnel change
- Greater variety of tasks as a result of mission types and operational environments

### Self-Management

- Greater emphasis on ensuring that Soldiers balance and manage their personal matters and well-being

### Survivability

*The 2015 Objective Force family of systems is characterized by ... survivability – light weight materials, advanced survivability (Active Protection Systems), signature management... (The Objective Force in 2015, p. 27).*

*The Soldier is protected from disease and other environmental and biological health threats and is supported by a highly capable and responsive medical system... (The Objective Force in 2015, p. 25)*

- Improved protective systems, transportation, communication, and medical care will result in an incremental improvement in personal safety. However, Soldiers will still be in harm's way.
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This process gave us the opportunity to be explicit about what broad overall changes predicted for the Future Force actually meant for first-term Soldiers. One example of the questions we dealt with is, "What do predictions regarding the decentralization of decision making mean for first-term Soldiers?" The answer to this question is in the definition of *Disciplined Initiative* (see Table 5).

## *Identification of Army-Wide Future-Oriented KSAs*

While performance requirements focus on the work to be done, KSAs describe the human side of the equation. Initially, we focused on developing a comprehensive master list of human attributes that have been identified and measured reliably in the major domains of the individual differences literature. We submitted the master list to psychologists for review. After we were comfortable that the master list was comprehensive, we asked the SMEP and psychologists to rate the importance of the KSAs for future performance. Therefore, while the master list was intended to be comprehensive, the SMEP and psychologist ratings identified which of those KSAs are most likely to be needed in the future.

### *Literature Review*

The overall objective of the literature review was to generate a list of Army-wide future-oriented KSAs with strong research support. A list that would best serve Select21 project goals needed to have the following three characteristics:

- *Pre-enlistment focus.* Since the goal of the Select21 project is to develop measures that can be used for selection and classification, the KSA list should focus on characteristics that Soldiers bring with them to the job. Post-enlistment KSAs are ones that are learned or developed after job entry.
- *Comprehensiveness.* The KSA list should cover salient, measurable constructs from all relevant domains of individual differences. These constructs include basic traits such as cognitive, temperament, physical, psychomotor, and sensory attributes and pre-enlistment knowledges and skills like basic mechanical knowledge and basic computer skills.
- *Future-orientation.* The KSA list should contain attributes likely to be important to the performance of future Army jobs.

With those goals in mind, we identified three large-scale literature reviews to serve as a starting point for the KSA list: (a) Project A, (b) O\*NET, and (c) NCO21. The latest of those projects, NCO21, reviewed and incorporated information from Project A and O\*NET in the development of a list of KSAs for predicting first-term Soldier job performance. Therefore, it was the most inclusive effort and was our primary starting point for development of the Select21 KSA list.

*The Army's Project A.* An extensive literature review was conducted for the Army's Project A in the early 1980s (Peterson et al., 1990). More than 10,000 sources were identified and summarized in three literature reviews, one for each of the following domains: cognitive (Toquam, Corpe, & Dunnette, 1991), non-cognitive (Hough, 1988), and psychomotor (McHenry & Rose, 1988). After identifying potentially relevant constructs in each domain, the research team conducted an expert judgment investigation to cluster the predictor variables into higher-order factors. Although the Project A literature review is somewhat dated, it was exhaustive and provided a useful summary of human attributes having research support at the time.

*The Department of Labor's O\*NET.* The O\*NET project (Peterson, Mumford, Borman, Jeanneret, & Fleishman, 1999) identified a wide array of human attributes representing major domains—Basic and Cross-Functional Skills, Knowledge, Abilities, Occupational Interests and Values, and Work Styles. The research team conducted extensive literature reviews of each domain and arrived at sets of salient constructs. For example, the Abilities domain contained 21 cognitive abilities, 10 psychomotor abilities, 9 physical abilities, 7 sensory abilities, and 5 auditory and speech abilities (Fleishman, et al., 1999). The O\*NET literature review provided a useful basis for the KSA list.

*NCO21.* The NCO21 project integrated the Project A literature review, reviews from other projects (Anderson et al., 1995; Russell et al., 1996; Wise et al., 1991), project interviews, and a literature search. It resulted in a list of entry-level future KSAs (Ford et al., 2000). Importantly, the NCO21 project was future-oriented, and included KSAs relevant to the future that were not represented in predecessor lists.

#### *Development of the Army-Wide Future-Oriented KSA List*

The final list of 48 *Select21 Army-Wide Knowledges, Skills, and Attributes* is shown in Table 6. Similar to past efforts (e.g., Peterson et al., 1990), the KSAs are organized into the following categories of attributes representing important domains of human individual differences research: (a) cognitive, (b) temperament, (c) physical, (d) sensory, (e) psychomotor, and (f) procedural knowledge and skill.

We began by drafting a list of entry-level future KSAs. The initial list was based substantially on NCO21's first-term Soldier KSAs; however, it included KSAs from other relevant projects (e.g., Project A and O\*NET). KSAs were included based on the need for a list (a) that has a pre-enlistment focus, (b) is comprehensive, and (c) reflects a future orientation. This list was then circulated, at least twice, to HumRRO and ARI research staff for review and comment. The guiding principle in the reviews was to (a) identify KSAs that might need to be expanded or better delineated for measurement purposes during test development and (b) revise those KSAs in a manner consistent with existing research literature. For example, like NCO21, our initial list included only one KSA representing psychomotor ability. Reviewers believed that multiple, more differentiated, psychomotor attributes might be important for classification into Select21 project jobs. Project A and O\*NET materials were used to write definitions for more specific psychomotor constructs.

We also decided that, while it is not within the scope of our mission to measure physical abilities, they should be added to the Select21 list because (a) they are important, particularly for close combat jobs; (b) current medical enlistment tests generate scores related to some of these abilities; and (c) other Army organizations could benefit from these results. Therefore, we added the nine physical attributes resulting from the work of Fleishman and his colleagues (Fleishman et al., 1999). Additionally, we modified the temperament attributes to more fully represent the broad big five personality factors (i.e., Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Intellectance) and more narrow constructs targeted at performance in Army jobs in particular (e.g., Team Orientation, Self-Reliance).



*Table 6. Select 21 Army-Wide Knowledges, Skills, and Attributes*

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*Cognitive Attributes*

1. *Oral Communication Skill.* Speaks in a clear, organized, and logical manner. Communicates information or asks questions in an efficient and understandable way. Adapts communication styles to different situations. Uses nonverbal gestures to supplement and reinforce spoken messages.
2. *Oral and Nonverbal Comprehension.* Listens to and comprehends instructions and other related messages. Pays attention to nonverbal cues to help clarify/interpret messages. Asks questions as appropriate.
3. *Written Communication Skill.* Communicates thoughts, ideas, and information successfully to others through writing. Uses proper sentence structure including grammar, spelling, capitalization, and punctuation.
4. *Reading Skill/Comprehension.* Reads and understands written instructions, basic textbooks, and other related written material.
5. *Basic Math Facility.* Knows and applies addition, subtraction, multiplication, division, and simple mathematical formulas. Has the ability to read and interpret various types of graphs and figures (e.g., Cartesian planes).
6. *General Cognitive Aptitude.* The capacity to understand and interpret information that is being presented, the ability to identify problems and reason abstractly, and the capability to learn new things quickly and efficiently.
7. *Spatial Relations Aptitude.* The degree to which an individual can mentally visualize the relative positions of objects in two-dimensional or three-dimensional space, and how they will be positioned if they are moved or rotated in different ways.
8. *Vigilance.* The degree to which an individual can detect infrequent, simple signals over prolonged periods of time without rest.
9. *Working Memory.* The degree to which an individual can maintain information in memory such as words, numbers, pictures, and procedures for short periods of time and to retrieve it accurately.
10. *Pattern Recognition.* The degree to which an individual can detect a known figure or form that is only partially presented or hidden in distracting material.
11. *Selective Attention.* The degree to which an individual can concentrate while performing a task over a period of time without becoming distracted.
12. *Perceptual Speed and Accuracy.* The degree to which an individual can recognize and interpret visual information quickly and accurately, particularly with regard to comparing similarities and differences among words, numbers, objects, or patterns, when presented simultaneously or one after the other.

*Temperament Attributes*

13. *Team Orientation.* The degree to which an individual identifies with the team and other team members and works to boost team morale and increase the team bond.
14. *Agreeableness.* The degree of pleasantness versus unpleasantness exhibited by an individual in interpersonal relations. Is tactful, helpful, and not defensive, versus touchy, defensive, alienated, and generally contrary.
15. *Cultural Tolerance.* The degree to which an individual demonstrates tolerance and keeps an open mind with respect to individuals from other cultural and social backgrounds.
16. *Social Perceptiveness.* The degree to which an individual is aware of others' reactions and tries to understand why they react the way they do.
17. *Achievement Motivation.* The degree to which an individual sets high standards and strives for accomplishment.
18. *Self-Reliance.* The degree to which an individual depends upon his/her own abilities to overcome difficult or severe situations. Is confident in own abilities. When put in situations that require independent thinking or actions, is able to act appropriately.
19. *Affiliation.* The degree of sociability an individual exhibits. Is outgoing, participative, and friendly versus shy and reserved.

Table 6. (Continued)

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20. *Potency*. The degree of impact, influence, and energy that an individual displays. Is forceful, persuasive, optimistic, and vital versus lethargic and pessimistic.
21. *Dependability*. An individual's characteristic degree of conscientiousness. Is disciplined, well organized, planful, and respectful of laws and regulations, versus unreliable, rebellious, and contemptuous of laws and regulations.
22. *Locus of Control*. An individual's characteristic belief in the amount of control he/she has or people have over rewards and punishments.
23. *Intellectance*. The degree of openness to new experiences and culture an individual possesses and displays. Is imaginative, quick-witted, curious, socially polished, and independent minded versus artistically insensitive, unreflective, and narrow.
24. *Emotional Stability*. The degree to which an individual acts rationally and displays a generally calm, even mood. Typically maintains composure and is not overly distraught by stressful situations.

*Physical Attributes*

25. *Static Strength*. The ability to exert maximum muscle force to lift, push, pull, or carry objects.
26. *Explosive Strength*. The ability to use short bursts of muscle force to propel oneself (as in jumping or sprinting), or to throw an object.
27. *Dynamic Strength*. The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue.
28. *Trunk Strength*. The ability to use abdominal and lower back muscles to support part of the body repeatedly or continuously over time without "giving out" or fatiguing.
29. *Stamina*. The ability to maintain physical exertion over long periods of time without getting winded or out of breath.
30. *Extent Flexibility*. The ability to bend, stretch, twist, or reach out with the body, arms, and/or legs.
31. *Dynamic Flexibility*. The ability to quickly and repeatedly bend, stretch, twist, or reach out with the body, arms, and/or legs.
32. *Gross Body Coordination*. The ability to coordinate the movement of the arms, legs, and torso together in activities where the whole body is in motion.
33. *Gross Body Equilibrium*. The ability to keep or regain body balance to stay upright when in an unstable position.

*Sensory Attributes*

34. *Visual Ability*. The degree to which an individual, with or without corrective lenses, can see details at a distance, discriminate between different colors, see under low light conditions, see objects or movements of objects to his/her side when eyes are focused forward, judge which of several objects is closer or farther, and see objects in the presence of glare or bright lighting.
35. *Auditory Ability*. The degree to which an individual can detect or tell the difference between sounds that vary over a broad range of pitch and loudness, focus on a single source of auditory information in the presence of other distracting sounds, and tell the direction from which sounds originate.

*Psychomotor Attributes*

36. *Multilimb Coordination*. The ability to coordinate the movements of a number of limbs simultaneously.
37. *Rate Control*. The ability to time continuous anticipatory motor adjustments relative to changes in speed and direction of a continuously moving target or object.
38. *Control Precision*. The ability to make rapid, precise, highly controlled, but not overcontrolled, movements necessary to adjust or position a machine control mechanism (e.g., rudder controls). Control precision involves the use of larger muscle groups, including arm-hand and leg movements.
39. *Manual Dexterity*. The ability to skillfully, engage in well-directed arm-hand movements in manipulating fairly large objects under speeded conditions.

Table 6. (Continued)

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40. *Arm-Hand Steadiness*. The ability to make precise arm-hand positioning movements where strength and speed are minimized; the critical feature is the steadiness with which movements must be made.
  41. *Wrist, Finger Speed*. The ability to make rapid discrete movements of the fingers, hands, and wrists, such as in tapping a pencil on paper.
  42. *Hand-eye Coordination*. The ability to make precise movements under highly speeded conditions, such as in placing a dot in the middle of a circle, repeatedly, for a page of circles.

*Procedural Knowledge and Skill*

43. *Basic Computer Skill*. Uses personal computers and software programs. Creates and maintains computer files. Locates and uses information on the Internet and uses other Internet functions including e-mail.
  44. *Basic Electronics Knowledge*. Knows general information regarding electronics principles and electronics equipment operation and repair.
  45. *Basic Mechanical Knowledge*. Knows general information regarding mechanical principles, tools, and mechanical equipment operation and repair.
  46. *Self-Management Skill*. Uses appropriate strategies to self-manage the full range of personal responsibilities (e.g., goal setting, allocation of effort and personal resources, self-assessment of degree of goal accomplishment, and seeking help and advice from others when appropriate).
  47. *Self-Directed Learning and Development Skill*. Has a clear goal of maintaining continuous learning. Is proficient at determining learning needs, planning experiences to meet them, and evaluating personal success.
  48. *Sound Judgment*. Makes decisions or solves problems in ways that promote outcomes that are effective and rational.
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*Prioritization of Army-Wide, Entry-Level, Future-Oriented KSAs*

We collected and integrated data from research psychologists and the SMEP to identify KSAs from the master list that are most important for future entry-level performance. This work was also reviewed by the SRP.

*Psychologist panel*. We assembled a panel of 12 research psychologists to collect their judgments about the KSAs. First, we asked the psychologists to make a “linkage” judgment—a judgment of whether a KSA (from Table 6) was relevant to effective performance in each performance dimension (in Table 4). The psychologists discussed each performance dimension and reached consensus regarding the KSAs relevant to it. After some discussion this group agreed not to link the KSAs to the first performance dimension, Performs Common Tasks, because it implies too a large number and variety of tasks for linkages to be informative. After reaching consensus on the linkages, psychologists independently rated the overall importance of each KSA for effective Army-wide, first-term Soldier performance. Raters used the following scale to make their ratings:

- 1 = unimportant (i.e., not needed)
- 2 = relatively unimportant (needed only to a small extent)
- 3 = moderately important (good to have)
- 4 = relatively important (everyone should have to some extent)
- 5 = extremely important (i.e., critical)

*SMEP.* We mailed the KSA importance rating questionnaires—identical to the ones used by psychologists in the panel meeting—to SMEP members. Five SMEP members returned completed questionnaires for analysis. The mean importance ratings for both the psychologists and the SMEP members are presented and discussed in Chapter 5.

Finally, we met with the SMEP. We presented the mean importance ratings made by the SMEP and by psychologists and led a discussion of the KSA list. After the discussion, we asked the SMEP members to individually rank order their top 10 KSAs for effective performance of first-term Soldiers on the Army-wide performance dimensions. We computed the means of their rank order assignments and discussed the results. Based on that discussion, we determined that one source of disagreement about one KSA, labeled Need to Achieve, was that some SMEP members felt the label was too suggestive of individual ambition. We changed the label to be Achievement Motivation. The SMEP also reviewed the linkage judgments made by the psychologist panel. The linkage judgments appear in Appendix E and are summarized, along with the importance ratings and top 10 rankings, in Chapter 5.

*SRP.* We met with the SRP and they reviewed the procedures and results of our efforts to identify Army-wide, future-oriented, entry-level KSAs. As mentioned in Chapter 1, the primary role of the SRP is to ensure the scientific integrity of our work. It is important to note here that we typically present our plans to the SMEP and incorporate their ideas and modifications into our procedures before performing the work. During this meeting, we presented the procedures described in this chapter and the content of the Army-wide performance dimensions and Army-wide KSAs to the SRP. Much of the discussion surrounded specific performance dimensions and KSAs. In all, the consensus was that our Army-wide performance dimensions and KSAs seemed to cover the job and person domains well.

## Chapter 4. Identification of MOS-Specific Performance Requirements and Knowledges, Skills and Attributes

### *Overview*

At this point, we had identified Army-wide performance requirements and KSAs, two target job clusters, and three target MOS within each of the two target clusters. Once the target clusters/MOS were selected, we began the process of collecting and synthesizing specific job analysis information for them. This process involved three steps: (a) fine-tuning the approach, (b) conducting job analysis workshops for each target MOS, and (c) reviewing job analysis information with the SMEP.

### *Fine-Tuning the Approach*

A primary reason for identifying two target clusters (and representative target MOS) for cluster/MOS-specific job analysis was to support the development of predictors that could demonstrate the potential for classification efficiency. As described in Chapter 1, we had originally planned to perform this specific analysis at the cluster level. Based on initially unsatisfactory results, we modified our unit of analysis to the three MOS identified as representative of each target cluster.

With this adjusted approach, we began gathering materials and information to develop three primary products:

- MOS-specific task statements—specific SL1 task statements drawn from Soldier’s Manuals for each target MOS
- MOS-specific task categories—broader categories of tasks that would form the initial framework for the development of cluster/MOS-specific criteria (i.e., performance rating scales and job knowledge tests)
- Cluster/MOS-specific anticipated future conditions—descriptions of the changes in the work environment, tools, and technologies over the course of the transformation to the Future Force.

We extracted SL1 tasks and task categories from the Soldier’s Manuals for each MOS to serve as the starting point for SME review in workshops (e.g., Department of the Army, 2002a, 2002b, 2002c, 2002d, 2002e).<sup>19</sup> For example, the 96B Soldier’s manual listed tasks in the following nine categories as being relevant to SL1:

1. Perform Map Operations
2. Secure Information and Materials
3. Manage Collection of Intelligence Information
4. Perform Reporting Duties

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<sup>19</sup> Preliminary information suggested that the Soldier’s manual for the 74B job was out of date. Therefore, a senior staff member gathered information and assembled a revised list of performance requirements to use as a starting point in workshops with 74B NCOs.

5. Disseminate Intelligence Information
6. Assist in Intelligence Preparation of the Battlefield
7. Develop Targets
8. Maintain Intelligence Materials
9. Analyze Intelligence Materials

Most task categories had more than one task. Three tasks were listed for “Perform Map Operations.” They were:

- Determine Map Products in Support of Operations
- Translate Incoming Information into Military Symbology
- Apply Marginal Information on Military Maps to Assist in Performance of Other Map Reading Tasks

### *Job Analysis Workshops*

Having fine-tuned our information needs, we conducted a series of workshops, one with each target MOS. The primary goals of the workshops were three-fold:

- Review, edit, and rate the importance of the MOS task categories;
- Rate the importance of KSAs to performance in the future; and
- Link KSAs to the task categories.

We conducted a series of workshops with three to nine NCOs each who were familiar with their MOS’s specific knowledge’s and skills at Fort Huachuca, Fort Gordon, Fort Knox, and Fort Benning. Each workshop had two parts: (a) tasks/task categories and (b) KSAs. We focused on tasks and task categories first. The SMEs reviewed and edited the wording of task statements and task categories. They discussed the changes and discussed ways in which the future would affect the tasks and their categories. The SMEs sometimes added, deleted, or merged task categories. Tasks were dropped or rewritten if they referred to out-of-date equipment or procedures<sup>20</sup>

During the KSA portion of the workshop, the SMEs rated the importance of the KSAs and linked KSAs to task categories. First, SMEs individually rated the importance of each of the KSAs to effective performance in the future on the MOS-specific portion of their MOS using a 3-point rating scale:

- 1 = Not very important
- 2 = Important
- 3 = Very Important

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<sup>20</sup> During these workshops we also collected importance ratings regarding task category importance. These ratings are not reported here because (a) very few of the task categories received low ratings, (b) some categories that received low ratings in the workshops were judged as important by members of the SMEP during their review, and (c) all of the task categories are at least somewhat important because related tasks appeared in the relevant Soldier manuals.

Next, SMEs linked the KSAs to the task categories. Starting with the first task category, the group nominated the KSAs that were most important for effective performance in that category. SMEs discussed each nominated KSA and decided whether it was important for effective task category performance, and therefore “linked” to the task category.

The job analysis workshops yielded three main products:

- MOS-specific lists of task categories and specific tasks within them provided in Appendix F,
- Ratings of the future importance of KSAs for each MOS which are analyzed and discussed in Chapter 5, and
- Linkages between the KSAs and the MOS-specific task categories provided in Appendix G.

#### *Cluster/MOS Anticipated Future Conditions*

We also developed anticipated future conditions for each cluster/MOS by drawing on (a) our review of materials forecasting characteristics of the Future Force (e.g., U.S. Army 2001; TRADOC, 2002), (b) discussions with SMEs during workshops, and (c) meetings with the SMEP. As an example, Figure 3 lists the anticipated conditions in the 21<sup>st</sup> century relevant to first-term 11B Soldiers. They are noticeably more specific than the Army-wide future conditions presented in Chapter 3 since we were able to focus on particular MOS. But, the future conditions did not turn out to be completely MOS-specific. The anticipated future conditions for CC and SINC included MOS-specific and cluster-wide conditions. Anticipated future conditions relevant to all target MOS in each cluster largely result from new equipment/technologies that would have pervasive effects (e.g., new vehicles in CC and automation that replaces some human tasks in SINC). Anticipated Future Conditions for the clusters and MOS appear in Appendix H.

#### *Finalizing Cluster/MOS-Specific Information*

We met with the SMEP to review job analysis results. The SMEP divided into two cluster-oriented subgroups—one for CC and one for SINC. Each group reviewed the MOS-specific products described previously for the MOS in the cluster. We asked the SMEP to review the job analysis materials with an eye toward future changes as well as technical accuracy. Most of the modifications they made had to do with improving the future orientation of tasks, task categories, and anticipated future conditions. For example, the SMEP knew that CC Soldiers were likely to be charged with controlling Unmanned Aerial Vehicles (UAVs) in the future and added this notion to the anticipated future conditions for the appropriate CC MOS.

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### **11B Infantryman**

- For the foreseeable future, infantry will continue to operate as mechanized infantry and light infantry. They will be delivered to the battle area by air, helicopter, ground vehicles, and walking.
- All infantry will see improvements in communication and location capability when in dismounted mode. This will include a GPS integrated navigation system.
- Individual weapon (e.g., rifle) improvements will include thermal sights, daylight sights, close combat optics, lasers, and weapon systems connected to a digital reporting recording network.
- The current dismounted infantryman combat load is about 80 lbs. (including sustainment load = 125 – 145 lbs.). Electronics will, in the short run, increase the combat load to about 95 lbs. In the medium to long-term, the goal is to achieve about a 65 lbs. Combat weight problems will be minimized with (a) new materials for ballistic protection, (b) new lethalties, and (c) exoskeletons/artificial muscles.
- Infantrymen will experience better individual protection through (a) integrated combat identification systems, (b) full time chemical/biological clothing, (c) intercepting body armor and (d) laser eye protection.
- Long term, possibilities include target detection and engagement without exposure (i.e., individual non-line-of-sight fire).
- Full C4I capability and situational awareness (SA) interconnectivity is dependent on the future development of lightweight, multiday power sources (i.e., batteries) that are rechargeable and logistically supportable.
- Changes in infantry technology will occur incrementally. Overall there will be no major mid-term changes to infantry organizations, formations, employment, or tactics.

### **Conditions Applicable to all 11B/19D/19K Close Combat Soldiers**

- Close Combat will be a vital part of the Future Force. However, it will evolve due to changes in missions, equipment, and organization. Until the Future Force and the specifics of its equipment become more defined it is difficult to predict with certainty the future of the specific military occupational specialties (MOS) that currently make up Close Combat.
- The primary functions of Close Combat jobs will continue to be:
  - Close with and destroy enemy personnel, weapons, equipment, and structures, using fire and maneuver, in both offensive and defensive operations;
  - Control, deny, or occupy disputed or hostile terrain; and
  - Perform the battlefield functions of mobility and survivability as well as most ground reconnaissance, surveillance, and target acquisition.
- Future Technologies - There are currently 16 different future combat systems (FCSs) and 3 non-FCS systems that define the Future Force. Many of these will ultimately impact the Close Combat Cluster. Some of the primary potential technologies include:
  - Interim wheeled combat vehicles in several combat variants,
  - FCS vehicle variants that perform a number of different combat roles including those now considered tank, infantry, fire support, and reconnaissance;
  - Directed energy (DE) and electro-magnetic (EM) direct fire weapons,
  - UAV/UGV/Robotics,
  - Individual Soldier Land Warrior technology, and
  - Robotic and follower-vehicle technology for load bearing, evacuation, transport, and resupply for mounted forces.

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*Figure 3. Anticipated conditions in the 21<sup>st</sup> century relevant to first-term 11B Soldiers.*



## Chapter 5. Prioritization of Knowledges, Skills, and Attributes

### Overview

The list in *Select21 Army-Wide Knowledges, Skills, and Attributes* (Table 6; Chapter 3) is a comprehensive master list of human attributes that have been identified in major domains of individual differences research. It defines 48 human characteristics that are likely to be important for effective first-term Soldier performance in the Future Force. Those 48 KSAs, however, are not equally important for future Army-wide performance, and they differ in importance across Clusters/MOS. Psychologists and SMEP members helped prioritize the KSAs for future Army-wide performance by making importance ratings described in Chapter 3. Experienced NCOs rated the importance of the KSAs for effective future performance in target MOS (see Chapter 4). This chapter presents the results of the KSA importance ratings.

### *Importance of KSAs to Future Army-Wide Performance*

As described in Chapter 3, psychologists and SMEP members rated the importance of the KSAs for future Army-wide performance using the following importance rating scale:

- 1 = unimportant (i.e., not needed)
- 2 = relatively unimportant (needed only to a small extent)
- 3 = moderately important (good to have)
- 4 = relatively important (everyone should have to some extent)
- 5 = extremely important (i.e., critical)

We computed intraclass correlation coefficients (ICCs) to assess the level of agreement among panelists in each group (Shrout & Fleiss, 1979). As shown in Table 7, the ICCs for both rater groups were good. The single-rater ICC is an estimate of the reliability of only one rater and can be compared across samples with different numbers of raters. As shown, the single rater reliability for the psychologist panel was higher than that of the SMEP, perhaps indicating that the psychologists are a more homogeneous group. The actual reliability of the mean importance rating across the raters is the “*n*-rater ICC.” The reliability for the 12 psychologists was high, .88, and the reliability for the SMEP was good, particularly for only five raters. Based on feedback of their independent ratings and the psychologist panel ratings, the SMEP members rank ordered their individual top 20 KSAs. We computed the mean ranking across the panelists.

*Table 7. Intraclass Correlations for Army-Wide Future KSA Importance Ratings*

Raters	<i>n</i>	Single-Rater ICC	<i>n</i> -Rater ICC
Psychologist Panel	12	.39	.88
SME Panel	5	.29	.67

Direct ratings are not the only source of information relevant to the importance of Army-wide KSAs. We also asked the psychologist panel to make consensus linkage judgments—judgments of which KSAs will be relevant to effective performance on each performance dimension in the future. We tallied the number of performance dimensions to which each KSA was linked as relevant. KSAs that are needed for several aspects of performance are more salient than those needed for only one or

two. As mentioned previously, linkage judgments were not made for the first performance dimension, Performs Common Tasks, because it implies too large a number and variety of tasks for linkages to be informative.

*Table 8. Army-Wide Future KSA Rating Data*

KSAs	SMEP		Psychologist Panel	
	Mean Importance (n = 5)	Mean Rank Order (n = 6)	Mean Importance (n = 12)	Number of Linkages to Performance Dimensions
6. General Cognitive Aptitude	4.40	1.40	4.67	11
21. Dependability	4.00	6.67	4.75	13
2. Oral and Nonverbal Comprehension	4.00	3.25	4.75	9
24. Emotional Stability	4.20	8.50	4.50	11
13. Team Orientation	3.80	5.67	4.75	3
15. Cultural Tolerance	4.20	7.75	4.33	3
4. Reading Skill/Comprehension	4.00	5.17	4.50	7
9. Working Memory	4.00	9.60	4.33	11
48. Sound Judgment	3.60	8.40	4.67	11
29. Stamina	4.00	13.83	4.25	1
25. Static Strength	4.00	14.00	3.92	1
18. Self-Reliance	3.60	9.60	4.25	7
27. Dynamic Strength	4.00	16.00	3.83	1
35. Auditory Ability	4.25	7.67	3.58	0
34. Visual Ability	4.25	8.00	3.50	0
17. Need to Achieve	3.60	-	4.08	7
32. Gross Body Coordination	4.00	12.25	3.67	1
1. Oral Communication Skill	3.80	10.33	3.83	3
28. Trunk Strength	3.75	-	3.75	1
33. Gross Body Equilibrium	4.00	15.00	3.42	1
26. Explosive Strength	3.75	-	3.67	1
46. Self-Management Skill	2.80	13.33	4.58	11
36. Multilimb Coordination	3.75	-	3.50	1
37. Rate Control	3.75	-	3.33	0
11. Selective Attention	3.80	15.00	3.17	2
12. Perceptual Speed and Accuracy	3.80	15.00	3.17	1
31. Dynamic Flexibility	3.75	-	3.17	1
42. Hand-eye Coordination	3.75	-	3.17	0
47. Self-Directed Learning and Development Skill	2.80	15.33	4.08	4
38. Control Precision	3.75	-	3.08	0
14. Agreeableness	3.20	-	3.58	3
5. Basic Math Facility	3.40	-	3.25	1
16. Social Perceptiveness	3.40	-	3.25	4
39. Manual Dexterity	3.75	-	2.83	0
43. Basic Computer Skill	3.00	-	3.58	2
30. Extent Flexibility	3.33	-	3.17	1
40. Arm-Hand Steadiness	3.50	-	2.92	0
20. Potency	2.80	-	3.58	3

Table 8. (Continued)

KSAs	SMEP		Psychologist Panel	
	Mean Importance ( <i>n</i> = 5)	Mean Rank Order ( <i>n</i> = 6)	Mean Importance ( <i>n</i> = 12)	Number of Linkages to Performance Dimensions
7. Spatial Relations Aptitude	3.20	-	3.17	1
8. Vigilance	3.20	-	2.83	0
3. Written Communication Skill	3.40	-	2.58	3
41. Wrist, Finger Speed	3.25	-	2.58	1
45. Basic Mechanical Knowledge	3.00	-	2.83	0
10. Pattern Recognition	3.00	-	2.58	1
44. Basic Electronics Knowledge	2.40	-	2.67	0
22. Locus of Control	1.80	-	3.25	5
19. Affiliation	2.40	-	2.58	2
23. Intellectance	1.80	-	2.92	4
Grand Mean	3.52		3.59	
Standard Deviation of Means	0.60		0.67	

*Note.* Linkages were made for 18 performance dimensions. The importance rating scale was: 1 = unimportant (i.e., not needed), 2 = relatively unimportant (needed only to a small extent), 3 = moderately important (good to have), 4 = relatively important (everyone should have to some extent); 5 = extremely important (i.e., critical). A dash indicates that the KSA was not ranked in the top 20 by two or more SMEP members.

The Army-wide future KSA data appear in Table 8 in the order of the average of the two initial mean importance ratings. There was considerable agreement across the samples and types of judgments. General Cognitive Aptitude, Dependability, Oral and Nonverbal Comprehension, and Emotional Stability all received mean importance ratings greater than 4.0 (on a 5-point scale) in both samples, were rank-ordered within the top 10 KSAs by the SMEP, and had nine or more linkages to performance dimensions. Conversely, most of the KSAs with low importance ratings in both groups (shown in the lower third of Table 9) had few, if any, linkages to performance dimensions, and were not rated in the top 20 KSAs by the SMEP. Ten KSAs received no linkages; however, as will be shown later in this chapter, those 10 KSAs received links to performance dimensions for at least one MOS.

The correlation between the two mean importance vectors was  $r = .48$ , indicating differences in the KSA importance ratings across the two samples. These differences were reduced, however, after the SMEP had the opportunity to discuss and then rank order the KSAs. For example, comparing the psychologist ratings and the initial SMEP importance ratings, differences of more than one point occurred for the following KSAs:

- Self-Management Skill,
- Locus of Control,
- Self-Development Skill,
- Intellectance, and
- Sound Judgment.

Psychologists gave higher ratings to these KSAs. After discussion, the SMEP members ranked three of these in their mean top 20:

- Self-Management Skill,
- Self-Development Skill, and
- Sound Judgment.

### *Importance of KSAs to Future Cluster/MOS Performance*

As described in Chapter 4, experienced NCOs for each target MOS rated the importance of KSAs to MOS-specific performance in the future on a 3-point rating scale (i.e., 1 = Not Important, 2 = Important, 3 = Very Important) and linked KSAs to task categories. In turn, the SMEP reviewed and commented on those judgments.

The samples of raters for the MOS-specific importance ratings were relatively small, ranging from three to nine. Largely, this was a consequence of timing in that preparations for deployments associated with Operation Iraqi Freedom reduced Soldier availability. While reviewing procedures and data, members of the SRP also noted that we should be cautious when interpreting the data, since the samples are small. To assess the reliability of the ratings, we computed ICCs. They appear in Table 9. As shown, the reliabilities are adequate, particularly given the small sample sizes. The reliability for the 96B raters was particularly high, perhaps suggesting more homogeneity among experiences and training within that MOS. The 11B MOS had more raters than 96B, but had lower reliability, perhaps indicating that the 11B raters had more diverse unit or assignment-specific experiences. While the 19K and 19D MOS single-rater reliabilities were about the same as those for 11B, 31U, and 74B, the small number of raters for these two MOS led to lower “*n*-Rater” ICCs.

*Table 9. Inter-Rater Agreement Coefficients for MOS-Specific KSA Ratings*

MOS	<i>n</i>	Intraclass Correlation Coefficient	
		Single Rater	<i>n</i> -Rater
11B	9	.20	.69
19D	4	.21	.51
19K	3	.20	.43
31U	6	.23	.64
74B	6	.23	.64
96B	8	.49	.88

We present the mean importance ratings and linkage results in the remainder of this chapter. Members of the SMEP knowledgeable about each MOS reviewed the ratings and the linkages. While they made very few comments about the importance ratings, most added linkages between KSAs and task categories. To avoid over-interpretation of those means, we attempt to point out broad trends that are consistent across data points. For example, we looked for consistencies between the importance ratings and the linkages between KSAs and task categories and for trends across MOS within a cluster.

### *CC MOS*

Table 10 shows the KSA importance data for CC MOS. Data are ordered by the mean of the MOS-specific mean importance ratings across the three CC MOS. As shown, the five most highly rated KSAs across CC MOS were Team Orientation, Dependability, Oral and Nonverbal

Comprehension, Self-Reliance, and General Cognitive Aptitude. Notably, these KSAs also link to a number of task categories for all of the CC MOS. KSA to performance category linkage matrices appear in Appendix G for each MOS.

Some trends in mean importance ratings between MOS are noteworthy. The correlations between the importance vectors were fairly high, but suggested some MOS differences. They were as follows: 11B and 19D  $r = .58$ , 11B and 19K  $r = .54$ , and 19D and 19K  $r = .41$ . The largest standard deviations around the grand mean across MOS occurred for Basic Computer Skill and Wrist, Finger Speed—neither of which was particularly highly rated for any of the three MOS.

### *SINC MOS*

Table 11 shows the KSA importance data for SINC MOS. Data are ordered by the mean of the MOS-specific mean importance ratings across the three SINC MOS. As shown, the five most highly rated KSAs across SINC MOS were Oral and Nonverbal Comprehension, Working Memory, Dependability, Reading Skill/Comprehension, and General Cognitive Aptitude. Notably, these KSAs also link to a number of task categories for all of the SINC MOS. The full performance category to KSA linkages appear in Appendix G.

The correlations between the mean importance vectors were fairly high, but suggested some MOS differences. They were as follows: 31U and 96B  $r = .61$ , 31U and 74B  $r = .52$ , and 74B and 96B  $r = .48$ . The largest standard deviations around the grand mean across MOS occurred for Sound Judgment, Stamina, Auditory Ability, and four physical abilities: Dynamic Strength, Trunk Strength, Dynamic Flexibility, and Manual Dexterity. It is interesting to note that Sound Judgment received a relatively low rating in the 31U SME workshop; however, the SMEP member representing this MOS commented that this KSA should have been rated higher for 31Us. Additionally, it is not immediately clear why Dynamic Flexibility received its highest mean rating from 74Bs. Higher mean ratings for 31Us on the other three physical abilities and Stamina, however, reflect the increased demand for 31Us to carry and install communications equipment in the field.

### *CC and SINC Compared*

Differences between CC and SINC KSA ratings can indicate which KSAs might provide greater classification efficiency. Table 12 compares the mean KSA importance ratings for CC and SINC MOS. The mean ratings are ordered according to the absolute value of the difference between the CC and SINC means (i.e., the last column). As shown, the largest differences occurred for psychomotor and physical attributes, with higher means for the CC cluster. The mean for Team Orientation was also higher for the CC cluster. The SINC Cluster mean importance was higher than the CC mean importance for Basic Computer Skill and Reading Skill and Comprehension.

The correlation between the two vectors of means was  $r = .57$ , indicating that the two profiles of means are similar. MOS and clusters are more similar to each other in terms of KSAs than performance requirements. That is, some human attributes (such as cognitive abilities) are predictive of performance in a wide assortment of jobs. It is, therefore, not surprising to obtain a fairly high correlations between two mean vectors of KSA ratings.

Table 10. KSA Importance Data for Close Combat MOS

		11B (n = 9)		19D (n = 4)		19K (n = 3)		Across MOS	
		Mean	Number of Linkages (k = 11)	Mean	Number of Linkages (k = 10)	Mean	Number of Linkages (k = 10)	Mean	SD
KSAs		Importance		Importance		Importance		Importance	
13.	Team Orientation	2.78	7	3.00	3	3.00	9	2.93	0.13
21.	Dependability	2.89	7	2.75	2	3.00	8	2.88	0.13
2.	Oral and Nonverbal Comprehension	2.56	8	3.00	2	2.66	9	2.74	0.23
18.	Self-Reliance	2.78	10	2.75	2	2.66	3	2.73	0.06
6.	General Cognitive Aptitude	2.33	9	3.00	2	2.66	10	2.66	0.33
15.	Cultural Tolerance	2.44	2	2.75	1	2.66	0	2.62	0.16
9.	Working Memory	2.67	9	2.75	6	2.33	6	2.58	0.22
46.	Self-Management Skill	2.67	5	2.75	0	2.33	2	2.58	0.22
34.	Visual Ability	2.56	9	2.75	4	2.33	3	2.55	0.21
47.	Self-Directed Learning and Development Skill	2.78	4	2.50	0	2.33	1	2.54	0.23
48.	Sound Judgment	2.78	8	2.50	3	2.33	4	2.54	0.23
42.	Hand-eye Coordination	2.33	6	2.50	4	2.66	4	2.50	0.16
1.	Oral Communication Skill	2.44	8	3.00	3	2.00	8	2.48	0.50
17.	Achievement Motivation	2.78	5	2.50	1	2.00	2	2.43	0.39
29.	Stamina	2.44	9	2.75	2	2.00	6	2.40	0.38
32.	Gross Body Coordination	2.33	7	2.50	0	2.33	4	2.39	0.10
35.	Auditory Ability	2.33	8	2.75	3	2.00	2	2.36	0.38
20.	Potency	2.33	0	2.00	0	2.66	1	2.33	0.33
38.	Control Precision	2.44	6	2.50	0	2.00	2	2.31	0.27
24.	Emotional Stability	2.33	9	2.25	6	2.33	0	2.30	0.05
26.	Explosive Strength	2.33	7	2.50	1	2.00	7	2.28	0.25
4.	Reading Skill/Comprehension	2.22	10	2.25	4	2.33	7	2.27	0.06
8.	Vigilance	2.00	5	2.75	1	2.00	0	2.25	0.43
33.	Gross Body Equilibrium	2.33	7	2.00	0	2.33	3	2.22	0.19
25.	Static Strength	2.11	7	2.50	1	2.00	7	2.20	0.26
39.	Manual Dexterity	2.11	7	2.50	2	2.00	3	2.20	0.26

Table 10. (Continued)

	KSAs	11B ( <i>n</i> = 9)		19D ( <i>n</i> = 4)		19K ( <i>n</i> = 3)		Across MOS	
		Mean Importance	Number of Linkages ( <i>k</i> = 11)	Mean Importance	Number of Linkages ( <i>k</i> = 10)	Mean Importance	Number of Linkages ( <i>k</i> = 10)	Mean Importance	<i>SD</i>
40.	Arm-Hand Steadiness	2.11	8	2.50	2	2.00	5	2.20	0.26
28.	Trunk Strength	2.22	7	2.25	0	2.00	6	2.16	0.14
36.	Multilimb Coordination	2.22	8	2.25	0	2.00	4	2.16	0.14
11.	Selective Attention	2.44	8	2.00	4	2.00	2	2.15	0.26
27.	Dynamic Strength	2.44	6	2.00	1	2.00	7	2.15	0.26
37.	Rate Control	2.33	6	2.00	2	2.00	4	2.11	0.19
45.	Basic Mechanical Knowledge	2.00	11	2.25	4	2.00	6	2.08	0.14
5.	Basic Math Facility	2.22	8	2.00	0	2.00	3	2.07	0.13
30.	Extent Flexibility	2.22	6	2.00	2	2.00	3	2.07	0.13
10.	Pattern Recognition	2.11	7	2.00	2	2.00	1	2.04	0.06
31.	Dynamic Flexibility	2.11	6	2.00	0	2.00	3	2.04	0.06
16.	Social Perceptiveness	1.78	6	2.00	0	2.33	1	2.04	0.28
12.	Perceptual Speed and Accuracy	1.78	6	2.25	2	2.00	4	2.01	0.24
14.	Agreeableness	1.67	0	2.00	0	2.33	0	2.00	0.33
19.	Affiliation	1.89	0	2.00	0	2.00	0	1.96	0.06
44.	Basic Electronics Knowledge	2.22	9	2.25	2	1.33	4	1.93	0.52
3.	Written Communication Skill	2.00	7	1.75	0	2.00	5	1.92	0.14
7.	Spatial Relations Aptitude	2.22	8	1.75	3	1.66	4	1.88	0.30
23.	Intellectance	1.89	0	2.25	1	1.33	1	1.82	0.46
22.	Locus of Control	1.67	4	1.75	0	2.00	0	1.81	0.17
43.	Basic Computer Skill	2.11	9	2.25	0	1.00	0	1.79	0.69
41.	Wrist, Finger Speed	1.67	5	2.25	0	1.00	3	1.64	0.63
Grand Mean		2.28		2.36		2.12		2.26	
Standard Deviation of Means		0.31		0.36		0.42		0.30	

Note. *k* = the number of task categories for the MOS.

Table 11. KSA Importance Data for Surveillance, Intelligence, and Communication MOS

KSAs	31U (n = 6)		74B (n = 6)		96B (n = 8)		Across MOS	
	Mean Importance	Number of Linkages (k = 13)	Mean Importance	Number of Linkages (k = 5)	Mean Importance	Number of Linkages (k = 8)	Mean Importance	SD
2. Oral and Nonverbal Comprehension	2.83	6	3.00	2	2.38	5	2.74	0.32
9. Working Memory	2.83	3	2.50	4	2.75	3	2.69	0.17
21. Dependability	2.67	7	2.67	3	2.63	2	2.65	0.02
4. Reading Skill/Comprehension	2.50	6	2.67	2	2.75	4	2.64	0.13
6. General Cognitive Aptitude	2.50	11	2.50	5	2.63	4	2.54	0.07
1. Oral Communication Skill	2.50	10	2.67	2	2.38	5	2.51	0.15
18. Self-Reliance	2.50	4	2.67	4	2.38	1	2.51	0.15
24. Emotional Stability	2.67	5	2.17	3	2.63	2	2.49	0.28
11. Selective Attention	2.67	3	2.17	4	2.50	3	2.44	0.25
17. Need to Achieve	2.50	0	2.50	3	2.25	0	2.42	0.14
47. Self-Directed Learning and Development Skill	2.50	4	2.33	2	2.38	2	2.40	0.09
15. Cultural Tolerance	2.33	0	2.00	0	2.50	1	2.28	0.25
48. Sound Judgment	2.83	13	1.33	4	2.63	2	2.26	0.81
43. Basic Computer Skill	2.17	3	2.00	0	2.50	2	2.22	0.25
46. Self-Management Skill	2.17	1	2.00	4	2.38	1	2.18	0.19
13. Team Orientation	2.33	1	1.83	2	2.25	1	2.14	0.27
3. Written Communication Skill	2.00	6	1.67	2	2.63	3	2.10	0.49
16. Social Perceptiveness	2.00	3	2.00	1	2.13	1	2.04	0.07
8. Vigilance	2.33	1	2.17	2	1.50	0	2.00	0.44
34. Visual Ability	2.17	1	2.33	3	1.50	0	2.00	0.44
42. Hand-eye Coordination	2.33	1	2.17	2	1.50	0	2.00	0.44
23. Intellectance	2.00	5	1.83	1	2.13	0	1.99	0.15
20. Potency	1.83	0	1.67	0	2.25	0	1.92	0.30
35. Auditory Ability	2.33	5	2.17	2	1.25	0	1.92	0.58
12. Perceptual Speed and Accuracy	2.00	1	1.83	2	1.88	2	1.90	0.09
14. Agreeableness	1.83	1	1.83	2	2.00	0	1.89	0.10
5. Basic Math Facility	1.67	4	2.00	0	1.88	1	1.85	0.17



Table 11. (Continued)

		31U ( <i>n</i> = 6)		74B ( <i>n</i> = 6)		96B ( <i>n</i> = 8)		Across MOS	
KSAs		Mean Importance	Number of Linkages ( <i>k</i> = 13)	Mean Importance	Number of Linkages ( <i>k</i> = 5)	Mean Importance	Number of Linkages ( <i>k</i> = 8)	Mean Importance	<i>SD</i>
29.	Stamina	2.50	6	1.67	0	1.38	0	1.85	0.58
44.	Basic Electronics Knowledge	2.17	8	1.83	0	1.38	0	1.79	0.40
10.	Pattern Recognition	1.33	1	2.17	3	1.75	2	1.75	0.42
25.	Static Strength	2.17	6	1.83	0	1.25	0	1.75	0.46
27.	Dynamic Strength	2.33	5	1.50	0	1.38	0	1.74	0.52
19.	Affiliation	1.83	0	1.50	1	1.88	0	1.74	0.21
41.	Wrist, Finger Speed	1.67	2	2.17	1	1.38	0	1.74	0.40
30.	Extent Flexibility	1.67	1	2.00	0	1.50	0	1.72	0.25
45.	Basic Mechanical Knowledge	2.00	5	1.50	0	1.63	0	1.71	0.26
33.	Gross Body Equilibrium	1.83	5	1.67	0	1.50	0	1.67	0.17
28.	Trunk Strength	2.17	3	1.67	0	1.13	0	1.65	0.52
40.	Arm-Hand Steadiness	1.83	0	1.83	0	1.25	0	1.64	0.34
32.	Gross Body Coordination	1.83	5	1.67	0	1.38	0	1.63	0.23
22.	Locus of Control	1.67	0	1.33	0	1.75	0	1.58	0.22
31.	Dynamic Flexibility	1.33	0	2.17	0	1.25	0	1.58	0.51
39.	Manual Dexterity	2.00	2	1.67	0	1.00	0	1.56	0.51
7.	Spatial Relations Aptitude	1.67	0	1.17	0	1.75	2	1.53	0.32
36.	Multilimb Coordination	1.83	0	1.33	1	1.25	0	1.47	0.32
37.	Rate Control	1.67	0	1.50	0	1.13	0	1.43	0.28
38.	Control Precision	1.33	0	1.83	0	1.13	0	1.43	0.36
26.	Explosive Strength	1.50	4	1.33	0	1.25	0	1.36	0.13
Grand Mean		2.17		2.17		1.81		2.05	
Standard Deviation of Means		0.41		0.42		0.55		0.38	

Note. *k* = number of task categories.

Table 12. KSA Importance Ratings Between and Across Clusters

KSAs		SINC		CC		Across Clusters		Absolute Difference
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
26.	Explosive Strength	1.36	0.13	2.28	0.25	1.82	0.65	0.92
38.	Control Precision	1.43	0.36	2.31	0.27	1.87	0.63	0.88
13.	Team Orientation	2.14	0.27	2.93	0.13	2.53	0.56	0.79
32.	Gross Body Coordination	1.63	0.23	2.39	0.10	2.01	0.54	0.76
36.	Multilimb Coordination	1.47	0.32	2.16	0.14	1.81	0.48	0.69
37.	Rate Control	1.43	0.28	2.11	0.19	1.77	0.48	0.68
39.	Manual Dexterity	1.56	0.51	2.20	0.26	1.88	0.46	0.65
40.	Arm-Hand Steadiness	1.64	0.34	2.20	0.26	1.92	0.40	0.56
33.	Gross Body Equilibrium	1.67	0.17	2.22	0.19	1.94	0.39	0.55
29.	Stamina	1.85	0.58	2.40	0.38	2.12	0.39	0.55
34.	Visual Ability	2.00	0.44	2.55	0.21	2.27	0.39	0.55
28.	Trunk Strength	1.65	0.52	2.16	0.14	1.91	0.36	0.50
42.	Hand-eye Coordination	2.00	0.44	2.50	0.16	2.25	0.35	0.50
25.	Static Strength	1.75	0.46	2.20	0.26	1.98	0.32	0.45
31.	Dynamic Flexibility	1.58	0.51	2.04	0.06	1.81	0.32	0.45
35.	Auditory Ability	1.92	0.58	2.36	0.38	2.14	0.31	0.44
43.	Basic Computer Skill	2.22	0.25	1.79	0.69	2.00	0.31	0.44
20.	Potency	1.92	0.30	2.33	0.33	2.12	0.29	0.41
27.	Dynamic Strength	1.74	0.52	2.15	0.26	1.94	0.29	0.41
46.	Self-Management Skill	2.18	0.19	2.58	0.22	2.38	0.28	0.40
45.	Basic Mechanical Knowledge	1.71	0.26	2.08	0.14	1.90	0.27	0.38
4.	Reading Skill/Comprehension	2.64	0.13	2.27	0.06	2.45	0.26	0.37
30.	Extent Flexibility	1.72	0.25	2.07	0.13	1.90	0.25	0.35
7.	Spatial Relations Aptitude	1.53	0.32	1.88	0.30	1.70	0.25	0.35
15.	Cultural Tolerance	2.28	0.25	2.62	0.16	2.45	0.24	0.34
11.	Selective Attention	2.44	0.25	2.15	0.26	2.30	0.21	0.30
10.	Pattern Recognition	1.75	0.42	2.04	0.06	1.89	0.20	0.29
48.	Sound Judgment	2.26	0.81	2.54	0.23	2.40	0.19	0.27
8.	Vigilance	2.00	0.44	2.25	0.43	2.13	0.18	0.25
19.	Affiliation	1.74	0.21	1.96	0.06	1.85	0.16	0.23
21.	Dependability	2.65	0.02	2.88	0.13	2.77	0.16	0.23
5.	Basic Math Facility	1.85	0.17	2.07	0.13	1.96	0.16	0.23
22.	Locus of Control	1.58	0.22	1.81	0.17	1.69	0.16	0.22
18.	Self-Reliance	2.51	0.15	2.73	0.06	2.62	0.15	0.22
24.	Emotional Stability	2.49	0.28	2.30	0.05	2.40	0.13	0.18
3.	Written Communication Skill	2.10	0.49	1.92	0.14	2.01	0.13	0.18
23.	Intellectance	1.99	0.15	1.82	0.46	1.90	0.12	0.16
44.	Basic Electronics Knowledge	1.79	0.40	1.93	0.52	1.86	0.10	0.14
47.	Self-Directed Learning and Development Skill	2.40	0.09	2.54	0.23	2.47	0.09	0.13
6.	General Cognitive Aptitude	2.54	0.07	2.66	0.33	2.60	0.09	0.12
9.	Working Memory	2.69	0.17	2.58	0.22	2.64	0.08	0.11
14.	Agreeableness	1.89	0.10	2.00	0.33	1.94	0.08	0.11

*Table 12.(Continued)*

KSAs		SINC		CC		Across Clusters		Absolute Difference
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
12.	Perceptual Speed and Accuracy	1.90	0.09	2.01	0.24	1.96	0.08	0.11
41.	Wrist, Finger Speed	1.74	0.40	1.64	0.63	1.69	0.07	0.10
1.	Oral Communication Skill	2.51	0.15	2.48	0.50	2.50	0.02	0.03
17.	Need to Achieve	2.42	0.14	2.43	0.39	2.42	0.01	0.01
16.	Social Perceptiveness	2.04	0.07	2.04	0.28	2.04	0.00	0.01
	Oral and Nonverbal							
2.	Comprehension	2.74	0.32	2.74	0.23	2.74	0.00	0.00
Grand Mean		1.98		2.26		2.12		0.35
Standard Deviation of Means		0.38		0.30		0.30		0.23

### *Analysis and Conclusions*

The purpose of this chapter was to summarize the job analysis results in terms of the relative importance of KSAs to Army-wide and cluster/MOS-specific future job performance. These results were in turn used to guide the development of predictor measures that could supplement the ASVAB's capacity to select and classify first-term Soldiers (Knapp, 2003).

As mentioned earlier, the sample sizes for ratings and linkage judgments were not large. Restricted access to SMEs because of the Iraq war was one reason for the low sample sizes for the MOS-specific ratings. Another reason was a lack of available SMEs with relevant expertise. This issue was especially salient for the Army-wide ratings and linkages. For these judgments, we needed individuals simultaneously familiar with current Army-wide performance requirements of first-term Soldiers and likely changes to the work associated with the transformation to the Future Force. The members of the SMEP were such individuals, however, there were very few of these individuals available. With regard to the MOS-specific judgments, the NCOs participating in our MOS-specific workshops were familiar with current performance requirements and changes that are likely to happen in the very near future. However, they were less familiar with potential longer-term changes associated with the transformation. This is the primary reason we made sure that the SMEP included individuals with the expertise to review the cluster/MOS-specific analysis results. The bottom line was that because of the future-oriented nature of this job analysis, the set of relevant potential raters was small.

Despite the small sample sizes, it was important to collect these ratings and judgments for at least three reasons. First, the process of rating and linking gave the NCOs, SMEP members, and psychologist panel members the opportunity to reflect and comment on the KSA list's completeness and definitions of the individual KSAs. This was an important point because as part of the measure development effort, project staff has attempted to identify feasible measures of most of the KSAs (Knapp, 2003).<sup>21</sup> Second, they provided empirical evidence that not all 48 KSAs are equally important to future performance. For example, Intellectance had a mean importance

<sup>21</sup> The physical abilities (e.g., static strength, dynamic flexibility) are a notable exception. Medical enlistment tests generate scores related to some of these KSAs, but they would not be adequate measures for our needs. Development of alternative measures is outside the scope of ARI's mission.

rating below 3.00 for both the SMEP and psychologist raters. Finally, they also provided empirical evidence that the target clusters and their representative MOS can be differentiated in terms of the relative importance of KSAs. For example, psychomotor and physical attributes were rated as more important to performance in the CC MOS than in the SINC MOS.

## Chapter 6. Discussion

As stated in Chapter 1, the objectives of the Select21 project are to (a) develop and validate measures of critical KSAs needed for successful execution of future Army missions and (b) propose the use of these measures as a foundation for an entry-level selection and classification system adapted to the demands of the 21<sup>st</sup> century. The project's methods and approach were designed to address the major characteristics of the research problem these objectives present. First, Select21 is attempting to develop measures that will predict performance in jobs that are yet to exist (i.e., expected future performance). Second, the effort is directed at improving the selection and classification of entry-level Soldiers. Finally, proposed measures will be evaluated in the context of an existing system that is substantially driven by the currently operational tests that make up the ASVAB.

### *The Future*

The future-oriented nature of this project required adjustments to traditional job analysis methods. Among these was an explicit establishment of a target future time period accompanied by basic assumptions about the Army during this time (e.g., the simultaneous existence forces at different stages of transformation). Additionally, we adopted a combined top-down and bottom-up approach to considering information about future projections and current performance requirements, respectively. This approach helped us combine future projections, that were (and remain) dynamic and relatively broad, with available information about current performance requirements that are more specific. A thorough explication of future-oriented performance requirements depended on this integration. This process was greatly facilitated by regular review of our job analysis products by the SMEP. They were a unique set of individuals who, as a group, combined specific knowledge about current performance requirements with awareness of the Army's transformation efforts. This way of looking at the future and methods that were useful in the NCO21 project led us to include Army-wide and cluster/MOS-specific anticipated conditions in the 21<sup>st</sup> century for first-term Soldiers as a separate performance requirement product. These anticipated conditions allowed us to more fully represent broad and dynamic future projections than we would have been able to if we had restricted the analysis to performance dimensions and tasks. In fact, they are the primary input to the development of expected future performance criteria, while the Army-wide performance dimensions, Army-wide common tasks, and cluster/MOS-specific tasks are the primary input to the development of current performance criteria.

### *Selection, Classification, and the Current System*

Like any good job analysis, the Select21 procedures and products were designed to support the rest of the effort. One element of this project is a focus on the future. Another is the need to support the development and evaluation of predictor measures that could improve the current system's capacity to select and classify entry-level Soldiers. The Army-wide job analysis products were designed to support the development of predictors to improve selection, while the cluster/MOS-specific products were designed to support the development of predictors to demonstrate potential improvements to classification. One of the reasons for the future-oriented job clusters was to identify target clusters and MOS to focus on for the cluster/MOS-specific portion of the job analysis. The method was effective for identifying clusters and MOS that were

(a) critical to the Future Force, (b) differentiated in terms of performance requirements and pre-enlistment KSAs, and (c) practical in terms of access to sufficient SMEs and Soldiers to complete the job analysis and develop and evaluate predictor measures. The clusters, however, did not turn out to be a manageable unit of analysis for describing differences between clusters and guiding criterion measure development. Therefore, the cluster/MOS-specific tasks and task categories were developed for each of the three target MOS within each target cluster.

### *Performance Requirements*

Because past Army research has demonstrated the utility of multiple criteria in the context of criterion-related validation (e.g., Campbell & Knapp, 2001), Select21 plans included the development of Army-wide and cluster/MOS-specific performance ratings and job knowledge tests. The *Select21 Army-Wide Performance Dimensions for First-Term Soldiers* and cluster/MOS-specific tasks and task categories supported the development of scales for rating aspects of current job performance that are likely to remain important in the future. That is, raters will evaluate a Soldier's *current* performance in performance dimensions that are likely to be relevant to the Future Force (i.e., the Army-wide performance dimensions). Along the same lines, the Army-wide dimensions supported the development of a future-oriented criterion situational judgment test. The *Select21 Army-Wide Common Tasks for First-Term Soldiers* and the cluster/MOS-specific tasks support the development of job knowledge tests. The Army-wide and cluster/MOS-specific anticipated future conditions supported the development expected future performance rating scales. Consistent with the goals of the project, the design of the job analysis methods and products were tailored to facilitate the development of these criteria.

### *Knowledges, Skills, and Attributes*

Select21's list of KSAs have a pre-enlistment focus and are comprehensive. The list was judged to be sufficiently comprehensive to apply equally well for use in identifying KSAs important to Army-wide and cluster/MOS-specific performance. Chapter 5 (Knowledge, Skill, and Attribute Prioritization) summarized the results of exercises to evaluate the relative importance of the 48 *Select21 Army-Wide Knowledges, Skills, and Attributes* to Army-wide and cluster/MOS-specific performance. These results are being used to guide the development of experimental predictors that have the potential to improve selection and classification efficiency (Knapp, 2003). For example, a number of temperament/personality attributes (a) were evaluated as important to Army-wide performance, (b) are not currently assessed by the ASVAB, and (c) are the focus of three Select21 experimental predictors currently being developed. These attributes include Dependability, Cultural Tolerance, and Self-Reliance. The job analysis also identified KSAs that were judged to be differentially important across the two target clusters. Select21 predictor measures are currently being designed to assess a number of these KSAs. For example, relative to the SINC cluster, the CC cluster favors Team Orientation and some psychomotor abilities. Scales on three of the Select21 predictors are being designed to address Team Orientation. And, two psychomotor tests were added to the Select21 measure development plans, based substantially on this job analysis result. Relative to the CC cluster, the SINC cluster favors Basic Computer Skill and Reading Skill and Comprehension. The ASVAB already represents a good measure of Reading Skill and Comprehension; however, Select21 is developing a measure titled the Record of Pre-Enlistment Training and Experiences that covers basic computer skills.

### *Qualifications*

The Army's transformation plans continue to evolve. In response, we continue to monitor this process by collecting and reviewing the latest transformation documentation as it is released. The members of our ASC and SMEP and their contacts have been very helpful in this regard. Each time we receive new material it is reviewed to determine whether our plans need to change to accommodate new information. A number of documents have been reviewed since our major job analysis activities were completed (e.g., Joint/Army Concepts Directorate, 2003; UAMBL, 2003). Thus far these new and evolving materials have not presented information that changes our view of the likely future conditions for first-term Soldiers in the Army. Indeed, with regard to the broad themes (e.g., improvements in communications and weapons systems, diversity and frequency of deployments, and decentralized operations), prognostications have not changed substantially in the last few years (i.e., NCO21 [Ford et al., 2000]).

One caveat to these job analysis results is about attrition, reenlistment, and person-environment fit. The focus of job analysis is typically on identifying KSAs that will lead to measures that predict job performance. Most job analysis methods do not target other criteria such as attrition, reenlistment, and their attitudinal antecedents (e.g., job satisfaction, organizational commitment, and career intentions). Person-environment fit research shows that individuals with the necessary KSAs to perform the work tend to "fit" in an organization; however, it also shows that congruence between the incumbent and organization on occupational values and interests is also important (e.g., Dawis, England, & Lofquist, 1964). Fortunately there is a relatively large body of research on occupational values and interests. The Theory of Work Adjustment (Dawis et al., 1964) provides a framework for using these variables to predict attrition and other criteria. In the measure development stage of this project, we have drawn heavily on that research for the purpose of developing predictor measures of work values and interests.





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## APPENDIX A

### SELECT21 MEETINGS, BRIEFINGS, AND WORKSHOPS

#### *Select21 Meetings, Briefings, And Workshops*

Date	Event	Description
May 9, 2002	1 <sup>st</sup> SRP Meeting	Reviewed and commented on research plan with an emphasis on job analysis
June 17, 2002	Fort Lee CASCOT Briefing	Reviewed and commented on initial job clusters
June 25, 2002	Objective Force Task Force Briefing	Reviewed and commented on initial job clusters
July 23, 2002	2 <sup>nd</sup> SRP Meeting	Reviewed early job analysis results and preliminary selection of target job clusters
Aug. 28, 2002	Fort Knox Workshop	First attempt to develop cluster level Close Combat tasks
Sept. 5, 2002	Fort Monroe TRADOC Briefing	Briefed U.S. Army Training and Doctrine Command (TRADOC) on research plan and preliminary job analysis results
Sept. 27, 2002	Fort Benning Workshop	Review of second attempt to develop cluster level Close Combat tasks
Oct. 9, 2002	1st SMEP	Finalized selection of target clusters and representative MOS
Oct. 10, 2002	1 <sup>st</sup> ASC Briefing	Reviewed research plan and job analysis results to date including target clusters and initial drafts of Army-wide performance dimensions and KSAs
Dec. 10-11, 2003	Fort Huachuca 96B Workshop	Edited 96B (Intelligence Analyst) task and task categories, rated importance of KSAs, and linked KSAs to task categories
Dec. 12-13, 2003	Fort Gordon 31U & 74B Workshop	Edited 31U (Signal Support Systems Specialist) and 74B (Information Systems Operator/Analyst) task and task categories, rated importance of KSAs, and linked KSAs to task categories
Jan. 15-16, 2003	Fort Knox 19D & 19K Workshop	Edited 19D (Cavalry Scout) and 19K (M1 Armor Crewman) task and task categories, rated importance of KSAs, and linked KSAs to task categories
Jan. 17, 2003	Psychologist Workshop	HumRRO and ARI psychologists rated the importance of KSAs and linked them to Army-wide performance dimensions
Jan. 22-23, 2003	2 <sup>nd</sup> SMEP Meeting	Reviewed Army-wide and cluster/MOS job analysis results, evaluated importance of KSAs and performance requirements, and edited anticipated future conditions
Feb. 5, 2003	3 <sup>rd</sup> SRP Meetings	Review and comment on job analysis results

*Select 21 Meetings, Briefings, And Workshops (Continued)*

Date	Event	Description
Feb. 20, 2003	Briefing	Briefed an ARI sponsored external review panel on research plan and job analysis results
March 19-20, 2003	Fort Benning 11B Workshop	Edited 11B (Infantryman) task and task categories, rated importance of KSAs, and linked KSAs to task categories
March 27, 2003	2 <sup>nd</sup> ASC Briefing	Briefed overview of job analysis results
June 13, 2003	3 <sup>rd</sup> SMEP Meeting	Update on job analysis activities and review of 11B (Infantryman) results

## APPENDIX B

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## APPENDIX C

### DESCRIPTIONS OF SELECTED JOB CLUSTERS

#### Cluster 1: Close Combat

The primary functions of these jobs are to (a) close with and destroy enemy personnel, weapons, equipment, and structures, using fire and maneuver, in both offensive and defensive operations; and (b) control, deny, or occupy disputed or hostile terrain. These include the battlefield functions of mobility and survivability as well as most ground reconnaissance, surveillance, and target acquisition. At Skill Level 1 (SL1), incumbents perform as riflemen, crew loaders, assistant machine gunners, and pioneer team members. Incumbents also perform platform and weapons preventive maintenance checks and services (PMCS).

*Future Trends:* The overall battlefield orientation for jobs in this cluster is not likely to change during the period of transformation. However, the distinctions among many of the Close Combat jobs will lessen as the Army transforms. For example, the employment of future combat system (FCS) platforms will likely reduce the distinction between infantry and armor as single, integrated teams fight with mounted and dismounted Soldiers supporting each other.

*Current MOS:*

11B Infantryman

11C Indirect Fire Infantryman

12B Combat Engineer

14M Man Portable Air Defense System (MANPADS) Crewmember (Reserve)

19D Cavalry Scout

19K M1 Armor Crewman

55D Explosive Ordnance Disposal Specialist

#### Cluster 2: Non Line-of-Sight Fire

The primary function of these jobs is to operate platforms that (a) support maneuver forces to destroy, neutralize, or suppress the enemy by cannon, rocket, or missile fire; and (b) detect, engage, and destroy enemy aerial and missile attack and to neutralize enemy surveillance (including enemy unmanned aerial vehicles [UAVs]). This cluster includes both field artillery and air defense artillery Soldiers. Skill Level 1 (SL1) incumbents are primarily ammunition handlers and perform systems preventive maintenance checks and services (PMCS).

*Future Trends:* Substantial change is likely to be driven by advances in technology and by organizational changes. Currently, job distinctions exist among direct fires, different kinds of indirect fires (e.g., howitzers and rockets), and different kinds of air defense (e.g., tactical ballistic missile defense and short-range air defense [SHORAD]). Common future combat systems (FCS) platforms should provide line of sight (LOS), non-line of

sight (NLOS), and beyond line of sight (BLOS) fire support in the 0 to 50 km range for ground targets, eventually replacing all current indirect fire platforms. These may likely also provide SHORAD. Endo- and exo-atmospheric threats will likely still require separate to-be-designed platforms, although space-based weapons could assume some coverage. Future target acquisition will likely be completely automated, thus eliminating this as a distinct job.

*Current MOS:*

13B Cannon Crewmember  
13C Tactical Automated Fire Control Systems Specialist  
13D Field Artillery Tactical Data Systems Specialist  
13E Cannon Fire Direction Specialist  
13F Fire Support Specialist  
13M Multiple Launch Rocket System Crewmember  
13P MLRS Operations/Fire Direction Specialist  
13R Field Artillery Firefinder Radar Operator  
14E PATRIOT Fire Control Enhanced Operator/Maintainer  
14R Bradley Linebacker Crewmember  
14S AVENGER Crewmember  
14T PATRIOT Launching Station Enhanced Operator/Maintainer

Cluster 3: Surveillance, Intelligence, and Communications

The primary function of these jobs is to provide (a) surveillance; (b) intelligence; and (c) video, voice, and data communications support to forces in tactical environments. They provide information about the location and disposition of the enemy and facilitate communication among friendly forces. This function is very much equipment-dependent, and increasingly the equipment is both computer-based and systems-specific. At Skill Level 1 (SL1), incumbents primarily (a) set up and operate equipment, (b) install wiring and components, (c) record/report data and information, (d) repair/troubleshoot, and (e) prevent electronic countermeasures. These individuals work under the supervision of more experienced analysts.

*Future Trends:* Surveillance, intelligence, and sophisticated communications equipment is proliferating and moving to lower levels. Capabilities once found echelons above corps will increasingly be found at battalion level. There will be fewer cable-related tasks, as communications become increasingly wireless, satellite, and fiber-optic based. Technological advances are likely to simplify the set-up and operation of equipment and some tasks will become more automated (e.g., integrating data from multiple systems and tracking and identifying targets). These technicians may begin to have an increasingly larger role in software troubleshooting, debugging, and programming. Advances in automation and artificial intelligence capabilities could eventually eliminate the requirements for specialized job incumbents. However, as with all clusters that center on evolving electronic and computer capabilities, the short-term and long-term outlooks are very different. In the short-term, this cluster may become more diverse and demanding. As technologies mature, these jobs may become less specialized and eventually be consolidated.

*Current MOS:*

14J Air Defense Command, Control, Communications, Computers, and Intelligence Tactical Operations Center Enhanced Operator/Maintainer  
25R Visual Information Equipment Operator/Maintainer  
31C Radio Operator-Maintainer  
31F Network Switching Systems Operator-Maintainer  
31L Cable Systems Installer-Maintainer  
31P Microwave System Operator-Maintainer  
31R Multichannel Transmission Systems Operator-Maintainer  
31S Satellite Communications System Operator-Maintainer  
31U Signal Support Systems Specialist  
35J Telecommunications Terminal Device Repairer  
35N Wire Systems Equipment Repairer  
74B Information Systems Operator/Analyst  
74C Telecommunications Operator-Maintainer  
81T Topographic Analyst  
93C Air Traffic Control (ATC) Operator  
96B Intelligence Analyst  
96D Imagery Analyst  
96H Common Ground Station (CGS) Operator  
96R Ground Surveillance System (GSS) Operator  
98C Signals Intelligence Analyst  
98H Communications Locator/Interceptor  
98J Electronic Intelligence Interceptor/Analyst  
98K Signals Collection/Identification Analyst

Cluster 4: Unmanned Vehicle/Robotics Operator

Currently this cluster is limited to a single military occupational specialty (MOS) supporting a single unmanned aerial vehicle (UAV). The proponent is military intelligence (MI). UAVs provide real time imagery intelligence (IMINT) at division and corps level for reconnaissance, surveillance, target acquisition, and battle damage assessment. Skill Level 1 (SL1) incumbents perform preventive maintenance checks and services (PMCS), refueling, and loading/unloading operations.

*Future Trends:* As the technology matures and expands, this function should eventually envelop logistics and fire support as well as the full spectrum of air and ground reconnaissance, surveillance, and target acquisition. Casualty stabilization and evacuation (including telemedicine) and mine detection/clearing will also likely become the province of unmanned vehicles and/or robotics. Incumbent tasks will include operator maintenance, loading and unloading, recovery, and possibly some programming. Air systems will likely continue to require unique support and will remain separate. Ground systems may have more commonality and hence have less need for system specific operators. As systems proliferate, a new proponenty is likely to evolve.

*Current MOS:*

96U Tactical Unmanned Aerial Vehicle (TUAV) Operator

Cluster 5: Security and Civil Affairs

This cluster is typified by operations in hostile, non-hostile, and semi-hostile environments, often in missions that do not require the commitment of combat forces. Security and Civil Affairs (a) support tactical operations by providing area security, battlefield circulation control, processing of prisoners of war (POWs) and detainees, and reconnaissance and surveillance; (b) collect human intelligence (HUMINT) or information about criminal activity; (c) analyze, summarize, and report intelligence/information; and/or (d) disseminate persuasive or informational communications to indigenous civilian and combatant personnel (i.e., psychological operations [PSYOP]). Both PSYOP and HUMINT collection can require specific foreign language skills.

*Future Trends:* The functions of this cluster are likely to expand; however, little change is forecast in the basic operating posture of this cluster. Nevertheless, shifts away from specific theaters of interest to more global but localized conflicts will increase the diversity of possible employment. Increasingly, persons in this cluster will work directly with other government non-military groups and non-government organizations (NGOs) fulfilling mission specific requirements. The development of non-lethal force technology will enhance the capabilities during missions. Language translation technology may minimize the need to speak foreign languages.

*Current MOS:*

37F Psychological Operations Specialist  
38A Civil Affairs Specialist (Reserve Components)  
51M Firefighter  
95B Military Police  
95C Corrections Specialist  
95D Criminal Investigations Special Agent  
97B Counterintelligence Agent  
97E Human Intelligence Collector (HUMINT Collector)  
97L Translator/Interpreter (Reserve Components)  
98G Cryptologic Linguist

Cluster 6: Mechanical Maintenance/Repair

The primary function of these jobs is to repair and maintain internal combustion engines and accessories, power trains, chassis components, weapon systems, and/or shop equipment. Maintenance activity jobs are organized by echelon: unit maintenance (UM), direct support (DS) maintenance, and general support (GS) maintenance, with the scope of job activity being determined by the level of assignment. However, at all echelons, common Skill Level 1 (SL1) activities include inspection, damage assessment, troubleshooting, and the use of diagnostic equipment.

*Future Trends:* The introduction of future combat systems (FCSs) could profoundly affect the number and types of jobs in this cluster, likely streamlining the cluster. Simplifying required maintenance support is a major goal of the Future Army, and increased reliability and modular components could eliminate or greatly alter existing maintenance echelons. Simplification of UM functions could replace UM jobs with crew functions. The objective is to go from the current mechanic-to-systems ratio of 1:2 to a ratio of 1:23. At what are now DS and GS, new maintenance doctrine will be targeted toward split-based operations, modular unit operations, and reduced repair time. GS maintenance may be contracted out in the future. Minimizing the number of different FCS platforms will reduce the need for platform-specific maintainers.

*Current MOS:*

27T AVENGER System Repairer  
45B Small Arms/Artillery Repairer  
45D Self-Propelled Field Artillery Turret Mechanic  
45K Armament Repairer  
52C Utilities Equipment Repairer  
52D Power-Generation Equipment Repairer  
52E Prime Power Production Specialist  
52F Turbine Engine Driven Generator Repairer  
52X Special Purpose Equipment Repairer  
62B Construction Equipment Repairer  
63A Abrams Mechanic  
63B Light-Wheel Vehicle Mechanic  
63D Self-Propelled Field Artillery System Mechanic  
63G Fuel and Electrical Systems Repairer  
63H Track Vehicle Repairer  
63J Quartermaster and Chemical Equipment Repairer  
63M Bradley Mechanic  
63S Heavy-Wheel Vehicle Mechanic  
63W Wheel Vehicle Repairer  
63Y Track Vehicle Mechanic  
88L Watercraft Engineer  
88P Railway Equipment Repairer (Reserve Components)  
91A Medical Equipment Repairer

Cluster 7: Electronics Maintenance/Repair

The primary function of these jobs is to install, repair, and maintain electronic equipment, including communications and digital subsystems. Activities include system maintenance, diagnosing problems, and troubleshooting. Like the Mechanical Maintenance Cluster, electronics maintenance is echeloned by unit maintenance (UM), direct support (DS) maintenance, and general support (GS) maintenance. However, there are some highly specialized electronics maintenance systems, particularly in the communications and computer fields. Some of these are one-of-a-kind systems, and many are military adaptations of civilian electronic applications.

*Future Trends:* Increasingly, operators of specialized communications and computer systems will become maintainers as well. Most electronics repair will become modular replacement accomplished by the operator or crew. Eventually, standardization and increased electronics reliability will reduce the numbers and specialization required in this cluster; however, the short-term future is likely to be the opposite. As digital and information operations systems proliferate and more commercial-off-the-shelf systems are used, the demand for electronics and computer specialists is likely to increase. However, the long-term trends in this cluster will be very much like those outlined for Mechanical Maintenance, with increased contractor support and changes in the echelon system of maintenance.

*Current MOS:*

27E Land Combat Electronic Missile System Repairer  
27G CHAPARRAL and REDEYE Repairer  
27M Multiple Launch Rocket System Repairer  
33W Military Intelligence Systems Maintainer/Operator  
35B Land Combat Support System Test Specialist  
35D Air Traffic Control Equipment Repairer  
35E Radio and Communications Security (COMSEC) Repairer  
35F Special Electronic Devices Repairer  
35H Test, Measurement, and Diagnostic Equipment Maintenance Support Specialist  
35M Radar Repairer  
35Y Integrated Family of Test Equipment Operator and Maintainer  
39B Automatic Test Equipment Operator and Maintainer  
45G Fire Control System Repairer

Cluster 8: Aircraft Maintenance/Repair

The primary function of these jobs is to install, repair, and maintain aircraft mechanical, electrical, and/or electronic systems. Activities include inspection, damage assessment, the use of diagnostic instruments, and troubleshooting. Aircraft maintenance is a highly specialized function, traditionally with less tolerance for error than other maintenance functions. Most aircraft maintenance jobs are system specific, and incumbents are trained to perform on only one particular airframe. As with other maintenance assignments, jobs in this cluster are echeloned. At the unit maintenance (UM) level, incumbents serve as crewchiefs and assistant crewchiefs on individual aircraft.

*Future Trends:* No significant near-term changes are foreseen in this cluster. Jobs will likely continue to be airframe specific in the near- to mid-term. If new airframes are introduced (such as the Comanche), new aircraft maintenance and repair jobs will accompany them. At some point, Army aircraft, such as the Future Transport Rotorcraft, will likely become robotic which could eventually drastically change the focus and function of the cluster. However, Current Army aircraft will be retained far into the Future Army, and it is likely that the current system of maintenance and repair for those airframes will remain unchanged.



*Current MOS:*

35L Avionic Communications Equipment Repairer  
35R Avionic Radar Repairer  
67G Utility Airplane Repairer (Reserve Components)  
67N UH-1 Helicopter Repairer  
67R AH-64 Attack Helicopter Repairer  
67S OH-58D Helicopter Repairer  
67T UH-60 Helicopter Repairer  
67U CH-47 (or perhaps medium) Helicopter Repairer  
67V Observation/Scout Helicopter Repairer  
67Y AH-1 Attack Helicopter Repairer  
68B Aircraft Powerplant Repairer  
68D Aircraft Powertrain Repairer  
68F Aircraft Electrician  
68G Aircraft Structural Repairer  
68H Aircraft Pneudraulics Repairer  
68J Aircraft Armament/Missile Systems Repairer  
68N Avionic Mechanic  
68S OH-58D Armament/Electrical/Avionics Systems Repairer  
68X AH-64A Armament/Electrical Systems Repairer  
68Y AH-64D Armament/Electrical/Avionics Systems Repairer

Cluster 9: Administration

The primary function of these jobs is to provide administrative services in a variety of areas including personnel, accounting, finance, and information management. Activities include (a) preparing correspondence; (b) completing forms; (c) maintaining records and files; (d) explaining policies, rules, or regulations to others; (e) obtaining required authorizations, approvals, endorsements, or signatures; and (f) data entry.

*Future Trends:* As the Army moves to greater digitization, administrative records and forms are becoming less paper-based. Digital applications using commercial hardware and software are likely to result in a greater need for basic computer skills in word processing, Internet use, e-mail, spreadsheets, and database software. Digital records and communications technology will allow most administrative functions to be centralized at higher levels, eventually reducing the overall staffing requirements in this cluster. A single individual at unit level may be able to perform all administrative functions including personnel, finance, administration, and record keeping via access to unlimited databases.

*Current MOS:*

27D Paralegal Specialist  
71L Administrative Specialist  
73C Finance Specialist  
73D Accounting Specialist  
75B Personnel Administration Specialist  
75F Personnel Information System Management Specialist  
75H Personnel Services Specialist  
91G Patient Administration Specialist  
93P Aviation Operations Specialist

Cluster 10: Logistics/Supply Support

The primary operational function of jobs in this cluster is to provide logistical support to deployed troops. Activities include (a) operating transportation vehicles, (b) preparing supplies for shipment, (c) unloading and unpacking supplies, (d) maintaining inventory records, and (e) distributing supplies.

*Future Trends:* A central goal of the Future Army is the reduction of the logistics footprint. At some point, initiatives will affect this cluster in size, function, organization, and location (e.g., number of persons needed may decrease, inventory and accounting duties may be automated). The technological advances of the future combat system (FCS) will reduce the amount and bulk of both Class III (petroleum products/fuel) and V (ammunition) supplies, two of the most significant logistical requirements. Prime vendors will send supplies directly to the area of operations, reducing the time and distance they are under Army control. Although system support packs and configured loads will reduce handling and stockage requirements, the overall supply and support function is bound to remain at some level.

*Current MOS:*

55B Ammunitions Specialist  
77F Petroleum Supply Specialist  
88H Cargo Specialist  
88M Motor Transport Operator  
88N Transportation Management Coordinator  
91J Medical Supply Specialist  
92A Automated Logistical Specialist  
92G Food Service Operations  
92S Laundry and Textile Specialist  
92Y Supply Specialist

Cluster 11: Heavy Equipment Operator

The primary function of jobs in this cluster is to operate construction, earthmoving, and large-scale excavation, grading, and lift equipment. Heavy equipment operators build

skill through experience; entry-level jobs include equipment maintenance and basic level operator jobs performed under supervision. Equipment is generally militarized versions of civilian models.

*Future Trends:* Little change is foreseen in this cluster. Technology changes in civilian construction and transportation equipment will be reflected in military procurement of like items. There may be a trend towards increased contracting of these services, even in operational theaters, which may eliminate some of the more specialized operator jobs.

*Current MOS:*

12C Bridge Crewmember  
62E Heavy Construction Equipment Operator  
62F Crane Operator  
62G Quarrying Specialist  
62H Concrete and Asphalt Equipment Operator  
62J General Construction Equipment Operator  
88K Watercraft Operator  
88U Railway Operations Crewmember (Reserve Components)

Cluster 12: Craftworker

The primary function of jobs in this cluster is to fabricate and maintain facilities and/or equipment. The majority of these jobs have fairly direct civilian equivalents (e.g., machinist, interior electrician, and plumber). Activities include (a) reading plans and specifications; (b) determining the tools, equipment, and materials needed; (c) assembling, installing and/or fabricating; and (d) maintaining tools and equipment.

*Future Trends:* Advances in technology and the need for a smaller logistical tail may result in the consolidation of some of these jobs and increased contracting of these activities to vendors, particularly within the continental United States (CONUS).

*Current MOS:*

00B Diver  
44B Metal Worker  
44E Machinist  
51B Carpentry and Masonry Specialist  
51K Plumber  
51R Interior Electrician  
51T Technical Engineering Specialist  
52G Transmission and Distribution Specialist (Reserve Components)  
81L Lithographer  
88T Railway Section Repairer (Reserve Components)  
92R Parachute Rigger

## Cluster 13: Medical Care, Health, and Well-Being

The primary function of jobs in this cluster is to provide care to personnel in terms of physical, psychological, and emotional well-being. Activities include administering emergency medical treatment, preparing clients/patients for procedures, maintaining patient files, and assisting chaplains and counselors. The primary focus is on active Army personnel but with a significant demand from families, a large retiree population, and a requirement to support indigenous populations during deployments.

*Future Trends:* Army medical specialists are at the start of a major transition period that will consolidate many existing medical jobs. Combat medics and licensed practical nurses will be combined into a single health care specialist job. Junior enlisted health care specialists will be required to gain certification by the National Registry of Emergency Medical Technicians, Basic Trauma Life Support and Trauma AIMS (trauma assessment, advanced airway, IV therapy, medication, and shock management). Long-term changes include increases in battlefield telemedicine and emphasis on robotic evacuation supported by buddy-aid and unit combat lifesavers. Services may eventually combine their medical care into a single joint services organization.

### *Current MOS:*

56M Chaplain Assistant  
91D Operating Room Specialist  
91E Dental Specialist  
91M Hospital Food Service Specialist  
91P Radiology Specialist  
91Q Pharmacy Specialist  
91T Animal Care Specialist  
91W Healthcare specialist  
91X Mental Health Specialist  
92M Mortuary Affairs Specialist

## Cluster 14: Skilled Science Technician

Jobs in this cluster cover a variety of areas. Their common threads are that they require skill in a scientific domain (e.g., biology, chemistry, and meteorology). Activities in these jobs include (a) inspecting; (b) following instructions, protocols, or laboratory procedures; (c) collecting and analyzing data; and (d) preparing and filing reports.

*Future Trends:* Advances in analytical technology are likely to simplify some aspects of performance while requiring specialized knowledge for operation of the technology. While some of the new technology will be specific to the military, much of it is likely to be commercially available software for tasks such as data analysis and information management. Jobs that require field operations or collection of data under operational conditions may be supplemented or replaced by technology such as unmanned and satellite systems. Increased civilianization or contract support could eliminate much of the core activity of this cluster.

*Current MOS:*

54B Chemical Operations Specialist  
77L Petroleum Laboratory Specialist  
77W Water Treatment Specialist  
82C Field Artillery Surveyor  
82D Topographic Surveyor  
91H Optical Laboratory Specialist  
91K Medical Laboratory Specialist  
91R Veterinary Food Inspection Specialist  
91S Preventive Medicine Specialist  
93F Field Artillery Meteorological Crewmember

Cluster 15: Media Specialist

Currently this cluster is conceptualized as including two subclusters: (1) media content and (2) media production. Media content jobs focus on preparing scripts and news releases and disseminating news and information. Media production jobs focus on operating collection and broadcast equipment and creating visual and audio information products.

*Future Trends:* In the future, the production activities will be increasingly automated so that only the content tasks may remain. While there is historical precedent for maintaining Soldier journalists and reporters, much of this cluster could become civilianized in the future.

*Current MOS:*

25M Multimedia Illustrator  
25V Combat Documentation/Production Specialist  
46Q Journalist  
46R Broadcast Journalist

Cluster 16: Band

Band members constitute the oldest continuous Army occupational cluster, dating back to colonial militias. There are approximately 20 active duty bands and an additional 30 reserve component bands. Band members usually perform on woodwinds and brass, percussion, and rhythm instruments. Entry-level Soldiers must possess pre-enlistment musical skills including sight-reading and instrument playing. Band members must pass an audition with a band before they are allowed to enlist in this cluster.

*Future Trends:* Little if any change is foreseen in this Cluster for the Future Army. Army bands will continue to play a significant role in the morale and public relations missions of the Army. Strong historical precedence will ensure the continuation of Soldier bands in traditional roles no matter what the evolution of the Future Army. Bands recently consolidated individual instrument MOS designations down to two jobs.

*Current MOS:*

02B Cornet or Trumpet Player  
02C Euphonium Player  
02D French Horn Player  
02E Trombone Player  
02F Tuba Player  
02G Flute Player  
02H Oboe Player  
02J Clarinet Player  
02K Bassoon Player  
02L Saxophone Player  
02M Percussion Player  
02N Keyboard Player  
02T Guitar Player  
02U Electric Bass Player

## APPENDIX D

### SELECT21 ARMY-WIDE COMMON TASKS FOR FIRST-TERM SOLDIERS

#### *Select21 Army-Wide Common Tasks for First-Term Soldiers*

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##### **Process Casualties**

Handle casualties or remains

##### *First Aid*

Evaluate a casualty

Perform basic first aid (i.e., CPR, shock prevention, clear throat of casualty)

Administer first aid to wounds to the abdomen or chest

Administer first aid for injuries to extremities or limbs (e.g., put on field dressing, tourniquet, splint)

Administer first aid for an open head wound

Administer first aid for burns or injuries from heat or cold

Administer first aid to CBRN casualty

Transport a casualty

Request medical evacuation

Operate telemedicine transmitting device

##### **Maintenance**

Conduct vehicle/FCS platform preventive maintenance checks and services

##### **Mine Installation/Recovery**

Locate and neutralize mines

Install antipersonnel mines

##### **Navigate**

Navigate using a compass, a map, and overlays

Navigate from one point on the ground to another point

Navigate using electronic or digital tools (e.g., global positioning system receivers)

Prepare field-expedient maps or overlays

##### **Survive**

React to combat situations (e.g., attack, ambush, direct/indirect fire) based on training, experience, and own judgment

Communicate by tactical voice or audio systems (e.g., tactical radio, tactical telephone)

Report information of potential intelligence value (SALUTE)

Prepare unit equipment for movement

Select, construct, and camouflage an individual fighting position

React to hazardous incidents (e.g., unexploded ordnance, hazardous materials) based on training, experience, and own judgment

Move through the battlefield, around obstacles, under fire, day or night using visual, hand, or arm signals

Camouflage yourself and your personal equipment

Camouflage equipment (other than personal)

*Select 21 Army-Wide Common Tasks for First-Term Soldiers (Continued)*

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- Employ hand-to-hand techniques
- Conduct guard duty
- Control entry into restricted areas
- Conduct a defense by a squad-sized unit
- Visually identify vehicles and aircraft (friend and foe)
- Establish an observation post
- Control or evacuate crowds/non-combatants
- Operate a vehicle in a convoy
- Defend against air attack
- Prevent subversion/espionage directed against the Army

**CBRN**

- Protect yourself and others from NBC injury/contamination using appropriate gear and/or mask
- Protect yourself from hazards (e.g., depleted uranium)
- Decontaminate yourself or individual equipment using decontamination kits
- React to a nuclear, chemical, or biological attack or hazard based on training, experience, and own judgment
- Detect or monitor chemical/biological agents using kits, papers, or monitoring devices
- Detect radiation and measure dose using detection and measurement tools
- Cross a contaminated chemical/nuclear area
- Prepare for a friendly nuclear attack

**Weapons**

- Operate personal weapon
- Engage targets with personal weapon
- Operate squad or crew-served weapon
- Engage targets with squad or crew-served weapon
- Maintain personal weapon
- Conduct safety checks on personal weapon
- Maintain squad or crew-served weapon
- Operate anti-armor weapon
- Engage targets with anti-armor weapon
- Conduct safety checks on squad or crew-served weapon
- Maintain anti-armor weapon
- Conduct safety checks on anti-armor weapon
- Locate a target by grid coordinates
- Prepare a range card

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## APPENDIX E

### LINKAGES BETWEEN ARMY-WIDE PERFORMANCE DIMENSIONS AND KSAS

Psychologist Panel Consensus Army-wide KSA/Performance Dimensions Linkage Matrix

KSA		Performs Common Tasks	Solves Problems /Makes Decisions	Exhibits Safety Consciousness	Adapts to Changing Conditions	Communicates in Writing	Communicates Orally	Uses Computers	Manages Information	Exhibits Cultural Tolerance	Exhibits Effort and Initiative on the Job	Follows Instructions and Rules	Exhibits Integrity and Discipline on the Job	Demonstrates Physical Fitness	Demonstrates Military Presence	Relates to and Supports Peers	Exhibits a Selfless Service Orientation	Exhibits Self-Management	Exhibits Self-Directed Learning	Demonstrates Teamwork
1	Oral Communication Skill						X		X											X
2	Oral and Nonverbal Comprehension		X	X			X		X	X		X				X			X	X
3	Written Communication Skill					X		X	X											
4	Reading Skill/Comprehension		X	X		X		X	X			X							X	
5	Basic Math Facility								X											
6	General Cognitive Aptitude		X	X	X	X	X	X	X			X						X	X	X
7	Spatial Relations Aptitude								X											
8	Vigilance																			
9	Working Memory		X	X	X	X	X	X	X			X						X	X	X
10	Pattern Recognition								X											
11	Selective Attention		X						X											
12	Perceptual Speed and Accuracy								X											
13	Team Orientation															X	X			X
14	Agreeableness									X						X				X
15	Cultural Tolerance									X						X				X
16	Social Perceptiveness		X							X						X				X
17	Need to Achieve				X						X			X	X			X	X	X
18	Self-Reliance		X		X						X		X					X	X	X
19	Affiliation															X				X
20	Potency										X				X					X
21	Dependability			X	X				X		X	X	X	X	X	X	X	X	X	X
22	Locus of Control				X						X							X	X	X
23	Intellectance		X		X					X									X	
24	Emotional Stability		X		X				X		X	X	X		X	X	X	X		X
25	Static Strength													X						
26	Explosive Strength													X						

*Psychologist Panel Consensus Army-wide KSA/Performance Dimensions Linkage Matrix (Continued)*

KSA		Performs Common Tasks	Solves Problems /Makes Decisions	Exhibits Safety Consciousness	Adapts to Changing Conditions	Communicates in Writing	Communicates Orally	Uses Computers	Manages Information	Exhibits Cultural Tolerance	Exhibits Effort and Initiative on the Job	Follows Instructions and Rules	Exhibits Integrity and Discipline on the Job	Demonstrates Physical Fitness	Demonstrates Military Presence	Relates to and Supports Peers	Exhibits a Selfless Service Orientation	Exhibits Self-Management	Exhibits Self-Directed Learning	Demonstrates Teamwork
27	Dynamic Strength													X						
28	Trunk Strength													X						
29	Stamina													X						
30	Extent Flexibility													X						
31	Dynamic Flexibility													X						
32	Gross Body Coordination													X						
33	Gross Body Equilibrium													X						
34	Visual Ability																			
35	Auditory Ability																			
36	Multilimb Coordination													X						
37	Rate Control																			
38	Control Precision																			
39	Manual Dexterity																			
40	Arm-Hand Steadiness																			
41	Wrist, Finger Speed							X												
42	Hand-eye Coordination																			
43	Basic Computer Skill							X	X											
44	Basic Electronics Knowledge																			
45	Basic Mechanical Knowledge																			
46	Self-Management Skill		X	X	X						X	X	X	X	X			X	X	X
47	Self-Directed Learning and Development Skill				X						X							X	X	
48	Sound Judgment		X	X	X	X	X	X	X			X						X	X	X



## APPENDIX F

### MOS-SPECIFIC PERFORMANCE REQUIREMENTS FOR TARGET MOS

#### **Infantryman (11B) Performance Requirements Skill Level 1**

- 1. Perform General Communications Functions**
- 2. Prepare, Install, and Operate Radios**
- 3. Perform Tactical Operations**
- 4. Perform General Navigation Functions**
- 5. Operate and Maintain Night Vision Devices**
- 6. First Aid**
- 7. Operate and Maintain the Infantry Fighting Vehicle (IFV)**
- 8. Operate and Maintain Weapons (M9, M16 Series, M203, M240 Series, M257, MK19, M249, M60, .50 M2 Machine Gun, M242, M4)**
- 9. Operate and Maintain Antitank Weapons (M136 Launcher, M220, Javelin)**
- 10. Perform General Weapons Functions and Operations**
- 11. Operate Hand Grenades/Mines/Pyrotechnics**

Defined by tasks:

#### **1. Perform General Communications Functions**

- Use Visual Signaling Techniques
- Install, Recover, and Repair Communication Wire Lines
- Perform Voice Communications
- Install and Operate Tactical Switchboards
- Operate Automated Net Control Device (ANCD)

#### **2. Prepare, Install, and Operate Radios**

- Construct a Field-Expedient Antenna
- Install, Maintain, and Operate Vehicle Mounted Radio Sets
- Operate in Radio Nets
- Recognize Electronic Attack (EA) and Implement Electronic Protection (EP)
- Prepare and Operate Single-Channel Ground and Airborne Radio Systems (SINCGARS) Mounted and Dismounted in Voice and Data Modes
- Operate a Retransmission Station (RETRANS)

### **3. Perform Tactical Operations**

- Move as a Member of a Fire Team
- Estimate Range
- Clear a Field of Fire
- Install Pickets, Barbed Wire, and Concertina
- Perform Movement Techniques During an Urban Operation
- Enter a Building During an Urban Operation
- Prepare Positions for Individual and Crew-Served Weapons During an Urban Operation
- Select Hasty Firing Positions During an Urban Operation
- Execute Mechanical Breach in an Urban Operation
- Engage Targets During an Urban Operation
- Perform as a Member of a Patrol
- Challenge Persons Entering Your Area
- Perform Individual Camouflage
- Sustain and Camouflage Fighting Positions
- Destroy Supplies and Equipment

### **4. Perform General Navigation Functions**

- Navigate with a Compass; Determine a Grid Azimuth Using Compass
- Navigate in a Vehicle Using Drivers Display and Navigational Devices
- Prepare, Operate, and Navigate Using Portable Ground Position Location System (GPS) Devices
- Read and Navigate with a Map and a Protractor

### **5. Operate and Maintain Night Vision Devices**

- Maintain and Operate Night Vision Sighting Devices
- Maintain and Operate Night Vision Goggles
- Maintain and Operate Mini Eyesafe Laser Infrared Observation Set (MELIOS)
- Maintain and Operate the Driver's Night Viewer on a Vehicle

## **6. First Aid**

- Evaluate a Casualty
- Perform Basic First Aid (i.e., CPR, Shock Prevention, Clear Throat of Casualty)
- Administer First Aid to Wounds to the Abdomen or Chest
- Administer First Aid for Injuries to Extremities or Limbs (e.g., Put on Field Dressing, Tourniquet, Splint)
- Administer First Aid for an Open Head Wound
- Administer First Aid for Burns or Injuries from Heat or Cold
- Administer First Aid to CBRN Casualty
- Transport a Casualty
- Request Medical Evacuation

## **7. Operate and Maintain the Infantry Fighting Vehicle (IFV)**

- Tow an IFV
- Maintain the Hull on an IFV
- Maintain Suspension System on an IFV
- Prepare a Range Card for an IFV
- Drive an IFV
- Extinguish a Fire on a IFV
- Start an IFV Using Auxiliary Power
- Load an Ammunition Ready Box
- Load a TOW Missile
- Stow Antitank Missiles in a Missile Storage Rack
- Maintain the Turret
- Maintain the Launcher and the Infrared Sites
- Identify Round Types per Target Types

**8. Operate and Maintain Weapons (M9, M16 Series, M203, M240 Series, M257, MK19, M249, M60, .50 M2 Machine Gun, M242, M4)**

- Zero a Weapon
- Engage Targets with Weapon
- Mount/Dismount a Night Vision Sight on a Weapon
- Zero a Night Vision Sight to a Weapon
- Engage Targets Using a Night Vision Sight
- Engage Targets with a Thermal Sight
- Mount/Dismount an Aiming Light on a Weapon
- Zero an Aiming Light to a Weapon
- Engage Targets with an Aiming Light
- Perform a Function Check On a Weapon
- Correct Malfunctions of a Weapon
- Mount/Dismount a Weapon on a Vehicle
- Maintain a Weapon

**9. Operate and Maintain Antitank Weapons (M136 Launcher, M220, Javelin)**

- Perform Misfire Procedures on a M136 Launcher/ Javelin
- Engage Targets with an M136 Launcher, M220, or Javelin
- Maintain an Antitank Launcher System
- Load/Unload an Antitank Launcher System
- Perform Immediate Action for a Launcher System Misfire
- Collimate a Series Night Sight to a Launcher System Optical Sight (Improved Tactical Acquisition System)
- Perform a System Self-Test on a Launcher System

**10. Perform General Weapons Functions and Operations**

- Maintain a Bayonet
- Prepare a Range Card for a Machine Gun
- Prepare an Anti-armor Range Card
- Engage an Enemy with a Bayonet
- Operate/Maintain M145 (Machine Gun Optics) Telescope, Straight
- Use Bore Sight, M2 Bore Light



## **11. Operate Hand Grenades/Mines/Pyrotechnics**

- Install and Remove an Antitank (AT) Mine
- Employ Hand Grenades
- Employ Pyrotechnics
- Locate Mines by Visual Means
- Install, Fire, and Employ an Anti-personnel Mine
- Set Up Booby Traps

**Cavalry Scout (19D) Performance Requirements  
Skill Level 1**

- 1. Operate in a Net-Centric Environment [includes use of existing communications equipment and the FBCB2 system]**
- 2. Prepare for and React to CBRN Threats**
- 3. Perform Tactical Operations and Functions**
- 4. Perform Mine and Demolition Functions and Operations**
- 5. Operate and Maintain Night Vision Devices**
- 6. Operate and Maintain Weapons (M9, M4, M16A1/M16A2, M203, MK19, M249, M240B, .50 M2 Machine gun)**
- 7. Operate and Maintain M47/M136/M220 Antitank Weapons**
- 8. Operate and Maintain Military UAV/UGV/Robotics**
- 9. Perform HMMWV Functions and Operations**
- 10. Perform Bradley Fighting Vehicle (BFV) Functions and Operations**
- 11. Perform General Skills**

**1. Operate in a Net-Centric Environment**

**Prepare, Operate, and Maintain Communications Equipment**

- Maintain Intercommunications Set AN/VIC-1 on a Tracked Vehicle
- Encode And Decode Messages Using KTC 600(\*) Tactical Operations Code
- Use the KTC 1400(\*) Numerical Cipher/Authentication System
- Recognize Electronic Countermeasures (ECM) and Implement Electronic Counter-Countermeasures (ECCM)
- Prepare SINCGARS (Manpack) for Operation
- Repair Telephone Cable WD-1/TT or WF-16/U
- Repair Field Wire Using Wire Splicing Kit MK-356(\*)/G
- Splice Field Wire (T-SPLICE)
- Install and Operate Telephone Sets
- Perform Operator PMCS on Telephone Set TA-312/PT

## **Perform FBCB2 Functions<sup>22</sup>**

- Operate the SINCGARS ASIP RT
- Operate the EPLRS Radio Set
- Operate the PLGR
- Operate the Automation Information System (AIS)
- Perform Before, During, and After PMCS on the FBCB2
- Perform FBCB2 Startup Procedures
- Apply FBCB2 Message Addressing Features
- Perform FBCB2 Message Management
- Prepare/Send Combat Messages on FBCB2
  - Overlays
  - Reports
  - Order/Request
  - Fire/Alert
  - Log Status
- Employ FBCB2 Functions
  - Map
  - Flash, immediate, priority, routine (FPIR)
  - Status
  - Admin
  - APPS
  - NAV
  - QUICK SEND
  - FILTERS
- Install Mission Data Load (MDL) on Target Platform
- Operate Data Transfer Device/Mission Data Loader (DTD/MDL)

## **2. Prepare for and React to CBRN Threats**

- Prepare/Use the Chemical Agent Monitor
- Prepare the Chemical Agent Monitor for Movement
- Operate M8A1 Alarm System
- Decontaminate Equipment Using ABC-M11 Decontaminating Apparatus
- Mark CBRN Contaminated Area
- Operate a Vehicle in a Contaminated Area

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<sup>22</sup> We are assuming that the FBCB2 functions will be performed by 19Ds in a manner similar to those currently performed by 19Ks.

### **3. Perform Tactical Operations and Functions**

- Identify Threat Weapons
- Extract Injured or Wounded Personnel from an Attack/Scout/Utility Helicopter
- Perform Duties of a Road Guide
- Use Visual Signaling Techniques
- Perform Duties of a Traffic Control Point
- Assemble Adjoining Map Sheets

### **4. Perform Mine and Demolition Functions and Operations**

- Install/Remove an M14 Antipersonnel Mine
- Install/Remove an M16A2 Antipersonnel Mine
- Install/Remove an M15 Antitank Mine Using an M624 Fuse
- Install/Remove an M15 Antitank Mine Using an M603 Fuse
- Install/Remove an M19 Antitank Mine
- Install/Remove an M21 Antitank Mine
- Prepare the AN/PSS-12 Mine Detector for Operation
- Locate Mines Using the AN/PSS-12 Mine Detector
- Install/Remove the M5 Pressure-Release Firing Device on Antitank Mines
- Construct an Electric Initiating Assembly
- Install Dual Firing Systems
- Neutralize Mines
- Install/Remove an M142 Multipurpose Firing Device
- Install/Recover a Mechanical Ambush

### **5. Operate and Maintain Night Vision Devices**

- Operate a Night Vision Sight AN/TAS-5
- Operate/Maintain a Night Vision Sight AN/PVS -4
- Operate/Maintain Night Vision Goggles AN/PVS -5
- Operate/Maintain a Thermal Viewer AN/PAS-7
- Operate/ Maintain Night Vision Goggles AN/PVS -7

### **6. Operate and Maintain Weapons (M9, M16A1/M16A2, M203, MK19, M249, M60, .50 M2 Machine gun)**

- Mount/Dismount a Night Vision Sight AN/PVS-4 on a Weapon
- Zero a Weapon
- Zero a Night Vision Sight AN/PVS-4 to a Weapon

- Engage Targets Using a Night Vision Sight AN/PVS-4
- Perform a Function Check on a Weapon
- Correct Malfunctions of a Weapon
- Mount/Dismount a Weapon on a Vehicle

## **7. Operate and Maintain M47/M136/M220 Antitank Weapons**

- Maintain an M47 Medium Antitank Weapon
- Restore an M47 Medium Antitank Weapon to Carrying Configuration
- Engage targets with an M47 Medium Antitank Weapon
- Perform Misfire Procedures on an M136 Launcher
- Engage Targets with an M136 Launcher
- Maintain an M220 Launcher System
- Load an M220 Launcher System
- Unload an M220 Launcher System
- Prepare an Anti-Armor Range Card
- Prepare an M47 Medium Antitank Weapon for Firing
- Perform Misfire Procedures on an M47 Medium Antitank Weapon

## **8. Operate and Maintain Military UAV/UGV/Robotics**

(This is a new PR, replacing Operate and Maintain Military Motorcycles; there are no tasks under it yet.)

## **9. Perform HMMWV Functions and Operations**

- Maintain the Cooling System on an M998-Series Vehicle
- Maintain the Fuel System on an M998-Series Vehicle
- Maintain the Transmission System on an M998-Series Vehicle
- Start an M998-Series Vehicle Using Slave Starting Operation
- Drive an M998-Series Vehicle
- Maintain the Air Cleaner System on an M998-Series Vehicle
- Maintain the Steering System on an M998-Series Vehicle
- Maintain the Engine on an M998-Series Vehicle
- Maintain the Brake System on an M998-Series Vehicle
- Maintain the Battery System on an M998-Series Vehicle
- Tow a Tracked Vehicle
- Maintain Operator's Part of Equipment Record Folder
- Recover a Wheeled Vehicle by Field Expedient Means

## **10. Perform Bradley Fighting Vehicle (BFV) Functions and Operations**

- Load/Unload the 25-MM Ammunition Can (HEI-T) on a BFV
- Load/Unload the 25-MM Ammunition Can (APDS-T) on a BFV
- Load/Unload the M257 Smoke Grenade Launcher on a BFV
- Maintain an M257 Smoke Grenade Launcher on a BFV
- Load/Unload the Tow Launcher on a BFV
- Maintain the Smoke Generating System on a BFV
- Maintain the Hull on a BFV
- Remove a Misfired Tow Missile from the Tow Launcher on a BFV
- Drive a BFV
- Extinguish a Fire on a BFV
- Start a BFV Using Auxiliary Power
- Operate the NBC System on an M2a1 or an M3A1 BFV
- Prepare a BFV for Fording
- Operate/Maintain the Driver's Night Viewer AN/VVS-2 on a BFV
- Inspect Ammunition And Prepare it for Stowing
- Perform Emergency Evacuation Procedures on the M3 BFV
- Stow Ammunition And Equipment on an M3 BFV
- Install/Remove an M240c Coaxial Machine Gun on an M3 BFV

## **11. Perform General Skills**

- Maintain Accountability of TOE Equipment
- Perform Preventive Maintenance on Basic Issue Items (BII)

**Armor Crewman (19K) Performance Requirements  
Skill Level 1**

- 1. Operate in a Net-Centric Environment [to include operation of current radio equipment and the FBCB2]**
- 2. Perform Tank Driver Functions and Operations**
- 3. Perform Tank Loader Functions and Operations**
- 4. Operate and Maintain Tank-Mounted Machine Guns**
- 5. Perform Tank Recovery and Towing Operations**
- 6. Perform Tank-Mounted Mine Clearing Equipment Services and Functions**
- 7. Perform Tank Maintenance Functions**
- 8. Maintain, Load, and Stow Tank Gun Ammunition**
- 9. Perform General Tank Crew Operations**
- 10. Perform Tank Gunnery [LOS and NLOS]**
- 11. Operate and Maintain Military UAV/UGV/Robotics**

**1. Operate in a Net-Centric Environment**

**Operate Radio Communication Equipment**

- Operate Radio Set AN/PRC-77 with TSEC/KY-38 Or 57
- Operate Radio Set AN/PRC-64 or AN/GRC-160 with TSEC/KY-38 Or 57
- Operate Radio Set AN/PRC-43 or AN/VRC-46 with TSEC/KY-57
- Operate Radio Set AN/PRC-12 or AN/VRC-47 with TSEC/KY-57
- Operate Radio Set AN/PRC-44 or AN/VRC-48 with TSEC/KY-57
- Operate Radio Set AN/PRC-45 or AN/VRC-49 with TSEC/KY-57
- Operate AN/PRC-12 Series Radio Sets with TSEC/KY-8 Or 38
- Operate FM Radio Sets With COMSEC Equipment HYL-3/TSEC
- Operate SINCGARS Single-Channel (SC) Frequency Hopping (FH) as Net Member or as Net Control Station (NCS)
- Install a Hot Loop
- Operate Intercommunications Set AN/VIC-1 (Includes FM Radio)
- Operate an FM Radio Set Using AN/GRA-39

### **Perform FBCB2 Functions on a Digital Tank**

- Operate the SINCGARS ASIP RT
- Operate the EPLRS Radio Set
- Operate the PLGR
- Operate the Automation Information System (AIS)
- Perform Before, During, and After PMCS On The FBCB2
- Perform FBCB2 Startup Procedures
- Apply FBCB2 Message Addressing Features
- Perform FBCB2 Message Management
- Prepare/Send Combat Messages On FBCB2
  - Overlays
  - Reports
  - Order/Request
  - Fire/Alert
  - Log Status
- Employ FBCB2 Functions
  - Map
  - Flash, immediate, priority, routine (FPIR)
  - Status
  - Admin
  - APPS
  - NAV
  - QUICK SEND
  - FILTERS
- Install Mission Data Load (MDL) on Target Platform
- Operate Data Transfer Device/Mission Data Loader (DTD/MDL)

## **2. Perform Tank Driver Functions and Operations**

- Perform Tank Driver's Before, During, and After-Operation Checks And Services
- Prepare the Tank Driver's Station for Operation
- Perform Fuel Transfer Procedures
- Operate the AN/VVS-2 Night Vision Viewer In The Tank Driver's Hatch
- Secure the Driver's Station
- Start/Stop the Tank Engine
- Slave Start the Tank
- Troubleshoot the Tank Using Driver's Control Panel Warning and Caution Lights or Drivers Integrated Display (DID) Warning and Caution Messages.
- Drive a Tank (All conditions: light, terrain, tactical, road march, formations)



- Perform Built-In Tests (BIT) On The DID on a Digital Tank
- Perform Diagnostics Mode Maintenance on the DID on a Digital Tank

### **3. Perform Tank Loader Functions and Operations**

- Perform Tank Loader's Before, During, and After-Operation Checks And Services
- Prepare the Tank Loader's Station for Operation
- Operate the AN/VVS-2 Night Vision Viewer in the Tank Loader's Hatch
- Load/Unload the Tank Main Gun
- Perform Tank Loader Main Gun Misfire Procedures

### **4. Operate and Maintain Tank-Mounted Machine Guns**

- Mount/Dismount a Caliber .50 Machine Gun
- Perform Operator Maintenance on a Caliber .50 Machine Gun
- Load/Unload a Caliber .50 Machine Gun
- Perform Operator Maintenance on an M240/M240C Machine Gun
- Engage Targets with the M240 Machine Gun from the Tank Loader's Station

### **5. Perform Tank Recovery and Towing Operations**

- Recover a Tank by Field Expedient Means
- Prepare and Tow a Tank

### **6. Perform Tank-Mounted Mine Clearing Equipment Services and Functions**

- Perform PMCS on the Tank Mounted Mine-Clearing Blade
- Operate the Tank Mounted Mine-Clearing Blade
- Perform Troubleshooting Procedures on the Tank Mounted Mine-Clearing Blade
- Operate the Tank Mounted Cleared-Lane Marking System
- Perform Troubleshooting Procedures on the Tank Mounted Cleared-Lane Marking System
- Perform PMCS on the Tank Mounted Cleared-Lane Marking System
- Unload a Mine-Clearing Roller Kit From the Trailer
- Install the Mine Roller Kit on a Tank
- Perform PMCS on the Tank Mounted Mine-Clearing Roller
- Operate the Tank Mounted Mine-Clearing Roller (clearing, pushbeam/roller assembly, winch)

## **7. Perform Tank Maintenance Functions**

### **Automotive Maintenance and Service**

- Inspect the Tank Hydraulics
- Unlock Stuck Tank Parking Brakes
- Prepare a Tank For Powerpack Removal
- Remove/Install Tank Track Block(s)
- Replace a Thrown Tank Track
- Service the Tank Air Induction System
- Troubleshoot the Tank Engine
- Troubleshoot the Tank Transmission

### **Main Gun Maintenance and Service**

- Service the Tank Replenisher
- Service the Tank Main Gun/Perform Breechblock Assembly Maintenance
- Troubleshoot the Tank Main Gun

### **Basic Issue Items (BII) Maintenance**

- Maintain Accountability of TOE Equipment
- Perform Preventive Maintenance on Tank Basic Issue Items

### **CBRN System Operation**

- Troubleshoot the Tank CBRN System/CBRN Backup

## **8. Maintain, Load, and Stow Tank Gun Ammunition**

- Inspect Tank Ammunition for Serviceability and Prepare it for Stowing
- Stow Ammunition in a Tank

## **9. Perform General Tank Crew Operations**

- Evacuate a Wounded Crewman from a Tank
- Decontaminate Equipment Using Portable Decontamination Equipment
- Assemble Adjoining Map Sheets
- Perform Duties of a Road Guide
- Use Visual Signaling Techniques
- Troubleshoot the AN/VVS-2 Night Vision Viewer
- Place the Tank CBRN System into Operation
- Extinguish a Fire on a Tank
- Operate the Tank Personnel Heater

**10. Perform Tank Gunnery (LOS and NLOS)<sup>23</sup>**

**11. Operate and Maintain Military UAV/UGV/Robotics**

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<sup>23</sup> (Performance requirements 10 and 11 are new; there are no tasks under them yet.)

**Signal Support Systems Specialist (31U) Performance Requirements  
Skill Level 1**

- 1. Maintain Test, Measurement, and Diagnostic Equipment (TMDE)**
- 2. Install, Configure, and Troubleshoot Commercial-Off-the-Shelf (COTS) Equipment**
- 3. Install, Troubleshoot, and Maintain Tactical Computers**
- 4. Install, Troubleshoot, and Maintain Very High Frequency Radios**
- 5. Operate Retransmission Stations (RETRANS) and EPLRS Network Management (ENM) System**
- 6. Install, Troubleshoot, and Maintain Tactical Satellite Equipment**
- 7. Maintain and Troubleshoot Communications Systems for Continuous Operations**
- 8. Restore Communications Security Equipment to Operation**
- 9. Install, Troubleshoot, and Maintain High/Ultra High Frequency Radios**
- 10. Install, Troubleshoot, and Maintain Mobile Subscriber Equipment (MSE)**
- 11. Explain to Operators Proper Use of Equipment**
- 12. Share Critical Information with Peers and Supervisors**
- 13. Identify Potential Threats to System Security**

- 1. Maintain Test, Measurement, and Diagnostic Equipment (TMDE)**
  - Perform Unit Level Maintenance (ULM) On Assigned Signal Support Systems TMDE
- 2. Install, Configure, and Troubleshoot Commercial-Off-the-Shelf (COTS) Equipment**
  - Configure a Desktop/Laptop IBM or Compatible Microcomputer for Operation
  - Install Network Hardware/Software in A Desktop/Laptop IBM or Compatible Microcomputer (e.g., Windows, Unix, FBCB2, Solaris)
  - Troubleshoot a Desktop/Laptop IBM or Compatible Microcomputer
  - Perform Unit Level Maintenance (ULM) on a Desktop/Laptop IBM or Compatible Microcomputer
  - Install Secure FAX machine
  - Troubleshoot Secure FAX machine
  - Perform Unit Level Maintenance (ULM) on Secure FAX machine
  - Install Telephone
  - Troubleshoot Telephone
  - Perform Unit Level Maintenance (ULM) on Telephone

### **3. Install, Troubleshoot, and Maintain Tactical Computers**

- Install a Tactical Local Area Network (LAN)
- Troubleshoot a Tactical Local Area Network (LAN)
- Install a Maneuver Control System (MCS)
- Troubleshoot a Maneuver Control System (MCS)
- Perform Scheduled Unit Level Maintenance (ULM) on Common Hardware System (CHS) Within a Standardized Integrated Command Post System (SICPS)
- Troubleshoot Common Hardware and Software Within a Standardized Integrated Command Post System (SICPS)
- Install Force XXI Battle Command Brigade and Below (FBCB2)
- Troubleshoot Force XXI Battle Command Brigade and Below (FBCB2)
- Perform Unit Level Maintenance on Force XXI Battle Command Brigade and Below (FBCB2)

### **4. Install, Troubleshoot, and Maintain Very High Frequency Radios**

- Install Secure ASIP, SIP and PRC-140 Radio Sets with or without the AN/VIC-1
- Troubleshoot Secure ASIP, SIP and PRC-140 Radio Sets with or without the AN/VIC-1
- Perform Scheduled Unit Level Maintenance (ULM) on Secure ASIP, SIP and PRC-140 Radio Sets with or without the AN/VIC-1
- Install Single-Channel Ground And Airborne Radio Systems (SINCGARs) ICOM with or without the AN/VIC-1 Or AN/VIS-3
- Troubleshoot Single Channel Ground And Airborne Radio Systems (SINCGARs) ICOM with or without AN/VIC-1 Or AN/VIS-3
- Program Radio Set COTS SABERS
- Troubleshoot Radio Set COTS SABERS
- Perform Unit Level Maintenance (ULM) on Radio Set COTS SABERS
- Install Multiplexer TD-1456/VRC

### **5. Operate Retransmission Stations (RETRANS) and EPLRS Network Management (ENM) System**

- Operate Secure AN/VRC-92 RETRANS
- Operate Secure Tactical Satellite (TACSAT) RETRANS Using AN/PSC-5
- Operate Enhanced Position Location Reporting System (EPLRS) Network Management (ENM) System

## **6. Install, Troubleshoot, and Maintain Tactical Satellite Equipment**

- Install Secure AN/VSC-117 or a Similar TACSATCOM Radio Set
- Troubleshoot Secure Tactical Satellite Communications (TACSATCOM) Radio Set AN/VSC-117 or a Similar TACSATCOM Radio Set
- Perform Scheduled Unit Level Maintenance (ULM) On Secure Tactical Satellite Communications (TACSATCOM) Radio Set AN/VSC-117 or A Similar TACSATCOM Radio Set
- Troubleshoot Single Channel Demand Assigned Multiple Access (DAMA) Tactical Satellite Terminal AN/PSC-5
- Perform Scheduled Unit Level Maintenance (ULM) on Single Channel Demand Assigned Multiple Access (DAMA) Tactical Satellite Terminal AN/PSC-5
- Troubleshoot Single Channel Anti-Jam Man Portable (SCAMP) Tactical Satellite Terminal AN/PSC-11
- Perform Scheduled Unit Level Maintenance (ULM) on Single Channel Anti-Jam Man Portable (SCAMP) Tactical Satellite Terminal AN/PSC-11
- Install Precision Lightweight Global Positioning System Receiver (PLGR)
- Troubleshoot Precision Lightweight Global Positioning System Receiver (PLGR)
- Perform Unit Level Maintenance (ULM) On Precision Lightweight Global Positioning System Receiver (PLGR)

## **7. Maintain and Troubleshoot Communications Systems for Continuous Operations**

- Troubleshoot Communications Equipment Within Standardized Integrated Command Post System (SICPS)
- Perform Unit Level Maintenance (ULM) On Communications Equipment Within Standardized Integrated Command Post System (SICPS)
- Perform Scheduled Unit Level Maintenance (ULM) On Antenna Group OE-254/GRC or a Similar Antenna System
- Troubleshoot STE-3 Telephone
- Perform Unit Level Maintenance (ULM) On STE-3 Telephone
- Install, Maintain, and Operate Generators
- Install, Maintain, and Operate Power Supply

## **8. Restore Communications Security Equipment to Operation**

- Restore to Operation Automated Net Control Device (ANCD) AN/CYZ-10 or Equivalent Equipment

**9. Install, Troubleshoot, and Maintain High/Ultra High Frequency Radios**

- Install Improved High Frequency Radio (IHFR) Set AN/GRC-213 or a Similar System
- Troubleshoot Improved High Frequency Radio (IHFR) set AN/GRC-213 or a Similar System
- Perform Scheduled Unit Level Maintenance (ULM) on Improved High Frequency Radio (IHFR) Set AN/GRC-213 or a Similar System
- Install Enhanced Position Location Reporting System (EPLRS) Radio Set AN/VSQ-2(V)1/(V)2
- Troubleshoot Enhanced Position Location Reporting System (EPLRS) Radio Set AN/VSQ-2(V)1/(V)2
- Perform Scheduled Unit Level Maintenance (ULM) On Enhanced Position Location Reporting System (EPLRS) Radio Set AN/VSQ-2(V)2

**10. Install, Troubleshoot, and Maintain Mobile Subscriber Equipment (MSE)**

- Install Mobile Subscriber Radiotelephone Terminal (MSRT) AN/VRC-97
- Troubleshoot Mobile Subscriber Radiotelephone Terminal (MSRT) AN/VRC-97 System
- Perform Scheduled Unit Level Maintenance (ULM) on Mobile Subscriber Radiotelephone Terminal (MSRT) AN/VRC-97

**11. Explain to Operators Proper Use of Equipment**

**12. Share Critical Information with Peers and Supervisors**

**13. Identify Potential Threats to System Security**

**Information Systems Operator/Analyst (74B) Performance Requirements  
Skill Level 1**

- 1. Prepare and Maintain Hardware/Software**
- 2. Perform Operations on the Automated Information System (AIS)**
- 3. Process Job Requests**
- 4. Maintain Systems Security**
- 5. Perform Systems Operation Functions**

**1. Prepare and Maintain Hardware/Software.**

- Perform maintenance checks and services on microcomputers, laptops, and peripherals
- Perform maintenance checks and services on host processor (supermini-computer)
- Pack, move, ship and store computer hardware
- Set up and tear down computer hardware
- Troubleshoot computer hardware
- Troubleshoot software systems (Windows, UNIX, Solaris)
- Install and configure routers
- Install and configure switches

**2. Perform Operations on the Automated Information System (AIS)**

- Monitor and perform functions to operate the Corps/Theater ADP Service Center in support of division and corps operations
- Perform defense message system (DMS) functions. (DMS includes anything with an army.mil designation including the so-called “tactical internet.” Unsure how this system is manned or the 74BSL1 role in it. DMS-A was initially fielded in 2000 and uses all COTS technology. It is essentially a worldwide ISP.)
- Provide electronic mail accounts.

**3. Process Job Requests**

- In an ADP service center operation
  - Accept and process requests for analysis or production of information.
  - Maintain log.
  - Distribute work requirements according to schedule.
  - Collect results and return to client.



#### **4. Maintain Physical Security**

- Control access to closed or restricted areas
- Control access to equipment
- Control access to programs and operating systems
- Set permission for users
- Establish passwords and access

#### **5. Perform Systems Operation Functions**

- Assist in the design of computer programs (e.g., web design using HTML or Front Page)
- Construct, edit, and test computer system programs
- Prepare a database
- Prepare a spreadsheet
- Prepare PPT presentation
- Prepare a word processing document

## **Intelligence Analyst (96B) Performance Requirements Skill Level 1**

- 1. Perform Map Operations**
- 2. Secure Information and Materials**
- 3. Manage Collection of Intelligence Information**
- 4. Perform Reporting Duties**
- 5. Disseminate Intelligence Information**
- 6. Assist in Intelligence Preparation of the Battlefield**
- 7. Develop Targets**
- 8. Maintain Intelligence Materials**

Defined by tasks:

### **1. Perform Map Operations**

- Determine Map Products in Support of Operations
- Translate Incoming Information into Military Symbolology
- Apply Marginal Information on Military Maps to Assist in Performance of Other Map Reading Tasks

### **2. Secure Information and Materials**

- Protect Classified Information and Material

### **3. Manage Collection of Intelligence Information**

- Develop Initial Specific Information Requirements (SIR)
- Extract Information From Collection Plan for Incorporation into Intelligence Annex of an Operations Order (OPORD)
- Determine Satisfaction of Priority Intelligence Requirements/Information Requirements (PIR/IR)
- Assist in Developing the Intelligence Collection Plan
- Determine Information Gaps and Discrepancies in Threat Holdings

### **4. Perform Reporting Duties**

- Assist in Preparing Paragraphs 1 and 2 of the Intelligence Estimate
- Prepare Intelligence Reports
- Gather Information for Intelligence Reports

- Assist Development of Enemy Capability, Vulnerability and Threat Assessments (Paragraph 3 of the Intelligence Estimate)
- Develop Initial Course(s) of Action (Paragraph 4 of the Intelligence Estimate)

## **5. Disseminate Intelligence Information**

- Conduct a Military Briefing

## **6. Assist in Intelligence Preparation of the Battlefield**

- Develop the Modified Combined Obstacle Overlay (MCOO)
- Determine Weather Effects on Operations
- Develop a Situation Template
- Assist Development of Event Template/Event Matrix
- Determine Area of Interest (AI)
- Develop Demographic and Population Overlay
- Develop an Incident Overlay
- Assist in the Development of Intelligence Preparation of the Battlefield (IPB) Products
- Create Link Diagrams
- Develop Association and Activities Matrices
- Develop Time Event Chart

## **7. Develop Targets**

- Assist in Target Nomination
- Identify High Value Targets
- Develop Battle Damage Assessment (BDA) Charts

## **8. Maintain Intelligence Materials**

- Maintain a Threat Database
- Maintain the Situation Map (SITMAP)



## APPENDIX G

### LINKAGES BETWEEN MOS-SPECIFIC PERFORMANCE REQUIREMENTS AND KSAS

Table G1. SME Consensus 11B KSA/Performance Dimensions Linkage Matrix

		Perform General Communications Functions	Prepare, Install, and Operate Radios	Perform Tactical Operations	Perform General Navigation Functions	Operate and Maintain Night Vision Devices	First Aid	Operate and Maintain the Infantry Fighting Vehicle (IFV)	Operate and Maintain Weapons (M9, M16 Series, M203, M240 Series, M257, MK19, M249, M60, .50 M2 Machine Gun, M242, M4)	Operate and Maintain Antitank Weapons (M136 Launcher, M220, Javelin)	Perform General Weapons Functions and Operations	Operate Hand Grenades /Mines/Pyrotechnics
1	Oral Communication Skill	X		X			X	X	X	X	X	X
2	Oral and Nonverbal Comprehension	X		X			X	X	X	X	X	X
3	Written Communication Skill	X		X				X	X	X	X	X
4	Reading Skill/Comprehension		X	X	X	X	X	X	X	X	X	X
5	Basic Math Facility		X	X	X			X	X	X	X	X
6	General Cognitive Aptitude	X		X	X		X	X	X	X	X	X
7	Spatial Relations Aptitude			X	X	X		X	X	X	X	X
8	Vigilance			X					X	X	X	X
9	Working Memory	X	X	X	X			X	X	X	X	X
10	Pattern Recognition				X		X	X	X	X	X	X
11	Selective Attention	X		X	X		X		X	X	X	X
12	Perceptual Speed and Accuracy	X						X	X	X	X	X
13	Team Orientation			X			X	X	X	X	X	X
14	Agreeableness											
15	Cultural Tolerance			X			X					
16	Social Perceptiveness			X			X		X	X	X	X
17	Achievement Motivation			X					X	X	X	X
18	Self-Reliance	X		X	X	X	X	X	X	X	X	X
19	Affiliation											
20	Potency											
21	Dependability	X		X			X		X	X	X	X
22	Locus of Control								X	X	X	X
23	Intellectance											
24	Emotional Stability	X		X	X		X	X	X	X	X	X

Table G1. (Continued)

		Perform General Communications Functions	Prepare, Install, and Operate Radios	Perform Tactical Operations	Perform General Navigation Functions	Operate and Maintain Night Vision Devices	First Aid	Operate and Maintain the Infantry Fighting Vehicle (IFV)	Operate and Maintain Weapons (M9, M16 Series, M203, M240 Series, M257, MK19, M249, M60, .50 M2 Machine Gun, M242, M4)	Operate and Maintain Antitank Weapons (M136 Launcher, M220, Javelin)	Perform General Weapons Functions and Operations	Operate Hand Grenades /Mines/Pyrotechnics
25	Static Strength			X			X	X	X	X	X	X
26	Explosive Strength			X			X	X	X	X	X	X
27	Dynamic Strength			X				X	X	X	X	X
28	Trunk Strength		X	X				X	X	X	X	X
29	Stamina		X	X	X		X	X	X	X	X	X
30	Extent Flexibility			X				X	X	X	X	X
31	Dynamic Flexibility			X				X	X	X	X	X
32	Gross Body Coordination			X			X	X	X	X	X	X
33	Gross Body Equilibrium			X			X	X	X	X	X	X
34	Visual Ability			X	X	X	X	X	X	X	X	X
35	Auditory Ability		X	X			X	X	X	X	X	X
36	Multilimb Coordination	X		X	X		X		X	X	X	X
37	Rate Control			X				X	X	X	X	X
38	Control Precision			X				X	X	X	X	X
39	Manual Dexterity			X			X	X	X	X	X	X
40	Arm-Hand Steadiness			X	X		X	X	X	X	X	X
41	Wrist, Finger Speed			X					X	X	X	X
42	Hand-eye Coordination			X				X	X	X	X	X
43	Basic Computer Skill	X	X	X	X			X	X	X	X	X
44	Basic Electronics Knowledge	X	X	X	X			X	X	X	X	X
45	Basic Mechanical Knowledge	X	X	X	X	X	X	X	X	X	X	X
46	Self-Management Skill			X					X	X	X	X
47	Self-Directed Learning and Development Skill								X	X	X	X
48	Sound Judgment			X	X		X	X	X	X	X	X

*Table G2. 19D SME Consensus on KSA/Performance Dimension Linkages*

[illegible]



Table G2. (Continued)

G-5			Prepare, Operate, and Maintain Communications Equipment	Prepare for and React to NBC Threats	Perform Tactical Operations and Functions	Perform Mine and Demolition Functions and Operations	Operate and Maintain Night Vision Devices	Operate and Maintain Weapons (Small Arms)	Operate and Maintain Antitank Weapons	Operate and Maintain Military Motorcycle (Scout)	Perform HMMWV Functions and Operations	Perform Bradley Fighting Vehicle Functions and Operations	Perform General Skills
26	Explosive Strength				X								
27	Dynamic Strength											X	
28	Trunk Strength												
29	Stamina			X	X								
30	Extent Flexibility										X	X	
31	Dynamic Flexibility												
32	Gross Body Coordination												
33	Gross Body Equilibrium												
34	Visual Ability				X		X	X	X				
35	Auditory Ability				X						X	X	
36	Multilimb Coordination												
37	Rate Control							X	X				
38	Control Precision												
39	Manual Dexterity					X			X				
40	Arm-Hand Steadiness							X	X				
41	Wrist, Finger Speed												
42	Hand-eye Coordination			X		X		X	X				
43	Basic Computer Skill												
44	Basic Electronics Knowledge										X	X	
45	Basic Mechanical Knowledge							X	X		X	X	
46	Self-Management Skill												
47	Self-Directed Learning and Development Skill												
48	Sound Judgment			X				X	X				

Table G3. 19K SME Consensus on KSA/Performance Dimension Linkages

		Operate Radio Communication Equipment	Perform Tank Driver Functions and Operations	Perform Tank Loader Functions and Operations	Operate and Maintain Tank-Mounted Machine Guns	Perform Tank Recovery and Towing Operations	Perform Tank Mounted Mine Clearing Equipment Services and Functions	Perform Tank Maintenance Functions	Maintain, Load, and Stow Tank Gun Ammunition	Perform General Tank Crew Operations	Perform FBCB2 Functions on a Digital Tank - Not Rated	Perform Tank Gunnery
1	Oral Communication Skill	X		X		X	X	X	X	X		X
2	Oral and Nonverbal Comprehension	X	X	X		X	X	X	X	X		X
3	Written Communication Skill	X		X				X	X	X		
4	Reading Skill/Comprehension	X		X			X	X	X	X		X
5	Basic Math Facility					X			X			X
6	General Cognitive Aptitude	X	X	X	X	X	X	X	X	X		X
7	Spatial Relations Aptitude				X	X				X		X
8	Vigilance											
9	Working Memory	X		X		X		X		X		X
10	Pattern Recognition											X
11	Selective Attention			X						X		
12	Perceptual Speed and Accuracy			X	X		X					X
13	Team Orientation	X	X	X		X	X	X	X	X		X
14	Agreeableness											
15	Cultural Tolerance											
16	Social Perceptiveness									X		
17	Need to Achieve		X									X
18	Self-Reliance				X				X			X
19	Affiliation											
20	Potency											X
21	Dependability		X	X		X	X	X	X	X		X
22	Locus of Control											
23	Intellectance											X
24	Emotional Stability											
25	Static Strength		X	X	X	X	X		X	X		
26	Explosive Strength		X	X	X	X	X		X	X		

Table G3. (Continued)

		Operate Radio Communication Equipment	Perform Tank Driver Functions and Operations	Perform Tank Loader Functions and Operations	Operate and Maintain Tank-Mounted Machine Guns	Perform Tank Recovery and Towing Operations	Perform Tank Mounted Mine Clearing Equipment Services and Functions	Perform Tank Maintenance Functions	Maintain, Load, and Stow Tank Gun Ammunition	Perform General Tank Crew Operations	Perform FBCB2 Functions on a Digital Tank - Not Rated	Perform Tank Gunnery
G-7	27 Dynamic Strength		X	X	X	X	X		X	X		
	28 Trunk Strength			X	X	X	X		X	X		
	29 Stamina			X	X	X	X		X	X		
	30 Extent Flexibility					X			X	X		
	31 Dynamic Flexibility					X			X	X		
	32 Gross Body Coordination					X	X		X	X		
	33 Gross Body Equilibrium					X			X	X		
	34 Visual Ability		X					X		X		
	35 Auditory Ability			X						X		
	36 Multilimb Coordination		X						X	X		X
	37 Rate Control				X				X	X		X
	38 Control Precision				X							X
	39 Manual Dexterity				X	X						X
	40 Arm-Hand Steadiness		X		X	X			X			X
	41 Wrist, Finger Speed				X				X			X
	42 Hand-eye Coordination		X	X	X							X
	43 Basic Computer Skill											
	44 Basic Electronics Knowledge		X		X			X				X
	45 Basic Mechanical Knowledge		X		X		X	X	X			X
	46 Self-Management Skill				X							X
	47 Self-Directed Learning and Development Skill											X
	48 Sound Judgment	X			X			X				X

Table G4. 31U SME Consensus on KSA/Performance Dimension Linkages

8-D			Maintain Test, Measurement, and Diagnostic Equipment (TMDE)	Install, Configure, and Troubleshoot Commercial-Off-the-Shelf (COTS) Computers	Install, Troubleshoot, and Maintain Tactical Computers	Install, Troubleshoot, and Maintain Very High Frequency Radios	Operate Retransmission Stations (RETRANS)	Install, Troubleshoot, and Maintain Tactical Satellite Equipment	Maintain and Troubleshoot Communications Systems for Continuous Operations	Restore Communications Security Equipment to Operations	Install, Troubleshoot, and Maintain High/Ultra High Frequency Radios	Install, Troubleshoot, and Maintain Mobile Subscriber Equipment (MSE)	Explaining to operators the proper use of equipment	Share critical information with peers and supervisors	Identify potential threats to system security
1	Oral Communication Skill			X	X	X		X	X		X	X	X	X	X
2	Oral and Nonverbal Comprehension			X	X							X	X	X	X
3	Written Communication Skill				X	X		X	X		X			X	
4	Reading Skill/Comprehension			X	X					X		X	X	X	
5	Basic Math Facility					X		X	X		X				
6	General Cognitive Aptitude		X		X	X		X	X	X	X	X	X	X	X
7	Spatial Relations Aptitude														
8	Vigilance														X
9	Working Memory		X							X					X
10	Pattern Recognition														X
11	Selective Attention				X							X			X
12	Perceptual Speed and Accuracy														X
13	Team Orientation				X										
14	Agreeableness													X	
15	Cultural Tolerance														
16	Social Perceptiveness			X									X	X	
17	Need to Achieve														
18	Self-Reliance					X		X	X		X				
19	Affiliation														
20	Potency														
21	Dependability			X	X	X		X	X		X				X
22	Locus of Control														
23	Intellectance					X		X	X		X				X
24	Emotional Stability			X	X							X	X	X	
25	Static Strength					X	X	X	X		X	X			
26	Explosive Strength				X		X	X	X						

Table G4. (Continued)

[illegible]

*Table G5. 74B SME Consensus on KSA/Performance Dimension Linkages*

	Prepare and Maintain Hardware/Software	Perform Operations on the Automated Information System (AIS)	Process Job Requests	Maintain Systems Security	Perform Systems Operation Functions
1 Oral Communication Skill			X	X	
2 Oral and Nonverbal Comprehension			X		X
3 Written Communication Skill			X		X
4 Reading Skill/Comprehension	X		X		
5 Basic Math Facility					
6 General Cognitive Aptitude	X	X	X	X	X
7 Spatial Relations Aptitude					
8 Vigilance		X		X	
9 Working Memory	X	X	X		X
10 Pattern Recognition		X	X	X	
11 Selective Attention	X	X		X	X
12 Perceptual Speed and Accuracy				X	X
13 Team Orientation		X	X		
14 Agreeableness		X	X		
15 Cultural Tolerance					
16 Social Perceptiveness			X		
17 Need to Achieve	X		X		X
18 Self-Reliance	X	X	X		X
19 Affiliation			X		
20 Potency					
21 Dependability			X	X	X
22 Locus of Control					
23 Intellectance		X			
24 Emotional Stability	X		X		X
25 Static Strength					
26 Explosive Strength					
27 Dynamic Strength					
28 Trunk Strength					
29 Stamina					
30 Extent Flexibility					
31 Dynamic Flexibility					
32 Gross Body Coordination					
33 Gross Body Equilibrium					
34 Visual Ability		X		X	X
35 Auditory Ability		X		X	
36 Multilimb Coordination					X

Table G5. (Continued)

		Prepare and Maintain Hardware/Software	Perform Operations on the Automated Information System (AIS)	Process Job Requests	Maintain Systems Security	Perform Systems Operation Functions
37	Rate Control					
38	Control Precision					
39	Manual Dexterity					
40	Arm-Hand Steadiness					
41	Wrist, Finger Speed	X				
42	Hand-eye Coordination	X			X	
43	Basic Computer Skill					
44	Basic Electronics Knowledge					
45	Basic Mechanical Knowledge					
46	Self-Management Skill	X		X	X	X
47	Self-Directed Learning and Development Skill	X				X
48	Sound Judgment	X		X	X	X

Table G6. 96B SME Consensus on KSA/Performance Dimension Linkages

		Perform Map Operations	Secure Information and Materials	Manage Collection of Intelligence Information	Perform Reporting Duties	Disseminate Intelligence Information	Assist in Intelligence Preparation of the Battlefield	Develop Targets	Maintain Intelligence Materials
1	Oral Communication Skill			X	X	X	X		X
2	Oral and Nonverbal Comprehension			X	X	X	X		X
3	Written Communication Skill				X	X	X		
4	Reading Skill/Comprehension			X	X	X	X		
5	Basic Math Facility						X		
6	General Cognitive Aptitude			X			X	X	X
7	Spatial Relations Aptitude						X		X
8	Vigilance								
9	Working Memory			X			X		X
10	Pattern Recognition			X			X		
11	Selective Attention			X			X		X
12	Perceptual Speed and Accuracy		X				X		
13	Team Orientation						X		
14	Agreeableness								
15	Cultural Tolerance						X		
16	Social Perceptiveness						X		
17	Need to Achieve								
18	Self-Reliance						X		
19	Affiliation								
20	Potency								
21	Dependability		X					X	
22	Locus of Control								
23	Intellectance								
24	Emotional Stability		X					X	
25	Static Strength								
26	Explosive Strength								
27	Dynamic Strength								
28	Trunk Strength								
29	Stamina								
30	Extent Flexibility								
31	Dynamic Flexibility								
32	Gross Body Coordination								
33	Gross Body Equilibrium								
34	Visual Ability								
35	Auditory Ability								
36	Multilimb Coordination								
37	Rate Control								
38	Control Precision								



Table G6. (Continued)

		Perform Map Operations	Secure Information and Materials	Manage Collection of Intelligence Information	Perform Reporting Duties	Disseminate Intelligence Information	Assist in Intelligence Preparation of the Battlefield	Develop Targets	Maintain Intelligence Materials
39	Manual Dexterity								
40	Arm-Hand Steadiness								
41	Wrist, Finger Speed								
42	Hand-eye Coordination								
43	Basic Computer Skill					X			X
44	Basic Electronics Knowledge								
45	Basic Mechanical Knowledge								
46	Self-Management Skill						X		
47	Self-Directed Learning and Development Skill						X	X	
48	Sound Judgment						X	X	



## APPENDIX H

### CLUSTER/MOS-SPECIFIC ANTICIPATED FUTURE CONDITIONS

#### **Anticipated Conditions in the 21<sup>st</sup> Century for Close Combat First-Term Soldiers**

##### **11B Infantryman**

- For the foreseeable future, infantry will continue to operate as mechanized infantry and light infantry. They will be delivered to the battle area by air, helicopter, ground vehicles, and walking.
- All infantry will see improvements in communication and location capability when in dismounted mode. This will include a GPS integrated navigation system.
- Individual weapon (e.g., rifle) improvements will include thermal sights, daylight sights, close combat optics, lasers, and weapon systems connected to a digital reporting recording network.
- The current dismounted infantryman combat load is about 80 lbs. (including sustainment load = 125 – 145 lbs.). Electronics will, in the short run, increase the combat load to about 95 lbs. In the medium to long-term, the goal is to achieve about a 65 lbs. Combat weight problems will be minimized with (a) new materials for ballistic protection, (b) new lethalties, and (c) exoskeletons/artificial muscles.
- Infantrymen will experience better individual protection through (a) integrated combat identification systems, (b) full time chemical/biological clothing, (c) intercepting body armor and (d) laser eye protection.
- Long term, possibilities include target detection and engagement without exposure (i.e., individual non-line-of-sight fire).
- Full C4I capability and situational awareness (SA) interconnectivity is dependent on the future development of lightweight, multiday power sources (i.e., batteries) that are rechargeable and logistically supportable.
- Changes in infantry technology will occur incrementally. Overall there will be no major mid-term changes to infantry organizations, formations, employment, or tactics.

## 19D Cavalry Scout

- Because of their autonomy, multi-functionality, diverse missions, reliance on technology and communications, and combined arms capabilities, the scout is probably the best existing exemplar of what the Unit of Action (UA) maneuver arms Soldier of the Future Army will be like.
- Scouts will continue to work in small, autonomous teams. Communicating with others (using technology) may become even more critical. The role of the FCBC2 system in reconnaissance communication requirements will increase as the system becomes more widely implemented and its capabilities become more fully realized.
- UAVs and UGVs will be essential to the reconnaissance function. These may even be found at the lowest (squad or section) level. Operation of these systems will likely be a scout team requirement.
- Technology may mean some tasks become less important or critical for scouts.
  - Monitoring and reconnaissance of chemical, biological, radiological, and nuclear (CBRN) threats are likely to diminish with automation. However, on an individual level, it will always be important to prepare for and react to CBRN threats.
  - Physical mine detection and clearing and some demolition functions and operations may be reduced or replaced by technology.
- Some performance requirements that are important now will continue to be important in the near future (i.e., next 10-15 years). The main skills that a SL1 scout needs are: (a) knowing how to operate communications equipment, (b) reporting information, (c) using night vision devices to fire weapons, navigate terrain, and drive vehicles, and (d) being proficient with numerous small arms. The specific requirements are:
  - Prepare, operate, and maintain communications (e.g., FBCB2) equipment;
  - Operate/maintain night vision devices and use to drive and fire weapons, and
  - Operate and maintain weapons (e.g., M9, M4, M203, MK19, M249, M240B, .50 M2 machine gun).
- The tactical operational sphere of scouts in the future may be even more widely spaced than it is today with autonomous operations pushed to an even lower level. This will increase the requirements on scout teams probably commensurate with increased capabilities. However, scouts will continue to be primarily an information gathering/information reporting entity, facilitating informed decisions by others in the chain of authority.

## 19K Armor Crewman

- Despite the development and introduction of new, lighter gun systems, the main battle tank (MBT) based on the M1 chassis and likely with a four-man crew, will continue to play a role in Army organizations and missions in the foreseeable future.
- Tank crewmen will continue to operate functionally in all roles (i.e., cross trained in all crew positions), regardless of the skill level of the tasks involved.
- The direct impact of future gun systems (e.g., Armored Gun System [AGS]/Future Combat System [FCS]/Mounted Combat System [MCS]) on Skill Level 1 (SL1) Soldier performance requirements is unknown and speculative at this time. However, it is anticipated that future systems will have both line-of-sight (LOS) and non-line-of-sight (NLOS) capability and will, in theory, be more complex systems. Future crew size, composition, or proponentcy is not known at this time.
- Increased detection and robotic capabilities will decrease the need for tank mounted mine clearing operations. However, tank mounted mine clearing operations will still be done to clear minefields that cannot be bypassed. It is anticipated that vehicle crewmen are likely to be the ones operating the robotic mine clearing equipment.
- In the foreseeable future, there will be a mix of armor-type systems and organizations (e.g., Stryker, AGS, FCS variants). Operational requirements and tasks for armor Soldiers during this period will likely be very unit and assignment dependent.
- Some types of unmanned aerial vehicles (UAVs), mules, unmanned ground vehicles (UGVs), and other robotics will likely be found as low a platoon level. Systems at this level will likely not have dedicated operators. Operation of these systems will likely become an additional skill requirement of some crewmen.
- Digital operations (e.g., Force XXI Battle Command/Brigade and Below [FBCB2] and successor systems) are paramount to mounted warfare down to the individual vehicle level. Communications, computer, and control systems will proliferate and improve over the next decade.
- The tank crew function most prone to replacement by technology and elimination of the position is that of the tank loader.

## Conditions Applicable to all First-Term 11B/19D/19K Close Combat Soldiers

- Close Combat will be a vital part of the Future Army. However, it will evolve due to changes in missions, equipment, and organization. Until the Future Army and the specifics of its equipment become more defined it is difficult to predict with certainty the future of the specific military occupational specialties (MOS) that currently make up Close Combat.
- The primary functions of Close Combat jobs will continue to be:
  - Close with and destroy enemy personnel, weapons, equipment, and structures, using fire and maneuver, in both offensive and defensive operations;
  - Control, deny, or occupy disputed or hostile terrain; and
  - Perform the battlefield functions of mobility and survivability as well as most ground reconnaissance, surveillance, and target acquisition.
- Future Technologies

There are currently 16 different future combat systems (FCSs) and 3 non-FCS systems that define the Future Army. Many of these will ultimately impact the Close Combat Cluster. Some of the primary potential technologies include:

  - Interim wheeled combat vehicles in several combat variants,
  - FCS vehicle variants that perform a number of different combat roles including those now considered tank, infantry, fire support, and reconnaissance;
  - Directed energy (DE) and electro-magnetic (EM) direct fire weapons,
  - UAV/UGV/Robotics,
  - Individual Soldier Land Warrior technology,
  - Robotic and follower-vehicle technology for load bearing, evacuation, transport, and resupply for mounted and dismounted forces.

## **Anticipated Conditions in the 21<sup>st</sup> Century for Surveillance Intelligence, and Communications (SINC) First-Term Soldiers**

### **31U Signal Support Systems Specialist**

- Greater span of responsibility.
  - More communications equipment in more vehicles and with more individuals
  - Each 31U Soldier is likely to be responsible for more pieces and a larger variety of equipment
  - This is a trend that is already happening
- Less need for technical depth in any particular area.
  - More modular replacement or just sending the item away to get repaired and less in-depth trouble-shooting or repair
  - This is a trend that is already happening
- Maintenance and use of measurement and diagnostic equipment may become more important.
- Installation, configuration, troubleshooting, and maintenance of (a) commercial-of-the-shelf equipment (COTS), (b) tactical computers, (c) global positioning system receivers may become more important, and (d) other common software and hardware.
  - COTS equipment includes desktop and laptop IBM compatible microcomputers, secure FAX machines, and telephones
  - Work with tactical computers includes local areas networks (LANs), software, and hardware
- Explaining the proper operation of equipment to operators may become more important and more frequent.
- Maintenance and troubleshooting of communications systems for continuous operations may become an easier, but more frequently performed activity.
- Installation, troubleshooting, and maintenance of mobile subscriber equipment (MSE) may become less important.

### **74B Information Systems Operator/Analyst**

- 74B Soldiers may be in increasingly lower echelons.
- As computer networks proliferate, the need for the 74B MOS will grow.
- Operating systems and application versions will continue to change (mostly COTS inspired).

- While the future is very difficult to predict for this MOS, “preparing and maintaining hardware/software,” a highly important performance area, will likely continue to remain highly important in the future. Maintaining systems security will continue to be very important in the future. Tactical integration into the MOS will be challenging [May not be trained in 31U, but will often be expected in the field.]

## **96B Intelligence Analyst**

- Skill Level 1 (SL1) 96B Soldiers are becoming more responsible for some tasks due to downsizing. “We’re having to do more with less.”
  - Especially, report preparation: (a) assisting in preparing Paragraphs 1 and 2 of Intelligence Estimates; (b) assisting in development of enemy capability, vulnerability, and threat assessments (i.e., Paragraph 3), and (c) developing course(s) of action (i.e., Paragraph 4)
- Protecting classified information and material may become more important because information can easily be distributed widely.
- Other tasks likely to become more important include:
  - Analyzing intelligence materials by creating link diagrams
  - Assisting in the development of enemy capability, vulnerability and threat assessments
  - Developing initial course of action
- The following tasks may be enabled by technology and become less frequently performed manually:
  - Determine map products in support of operations
  - Assist in developing the intelligence collection plan
  - Develop situation template
  - Assist in developing the event template/event matrix
  - Increasing automation of target tracking and identification
- Caveats:
  - Some tasks may have to be done manually in instances where technology is inaccessible. The knowledge to perform those tasks will still be important, but the mechanics of doing the task may change due to technology, and 96Bs will need to know manual methods as back-up.
  - 96Bs are generally assigned to one of two types of jobs: (a) a strategic-level job (e.g., Department of the Army and Pentagon) or (b) tactical jobs (e.g., table of organization and equipment [TO&E] unit). Experiences vary greatly between the two so it makes sense to “specialize” in one area or the other.



### **Conditions Applicable to all First-Term 31U/74B/96B SINC Soldiers**

- Technological advances may simplify installation, troubleshooting, and maintenance of equipment and some human tasks may be replaced with automation.
- More emphasis on avoiding enemy detection of friendly signals and preventing the enemy from jamming friendly signals.
- Increasing space communications, surveillance and recon technologies.
- Advances in automation and artificial intelligence capabilities could eventually eliminate the requirements for specialized job incumbents; however, human judgment will remain an essential element in the system. As with all jobs that center on evolving electronic and computer capabilities, the short-term and long-term outlooks are very different. In the short-term, this cluster may become more diverse and demanding. As technologies mature, these jobs may become less specialized and eventually be consolidated.
- The trend in the signal (i.e., 31U and 74B, not 96B) career fields may be towards more generalization and use of SSI. This could be reflected in an overall eventual decrease in the total number of distinct MOS in the career fields. There will be no special skill identifiers, even though Soldiers will know more specialties.